

PATENT ABSTRACTS OF JAPAN

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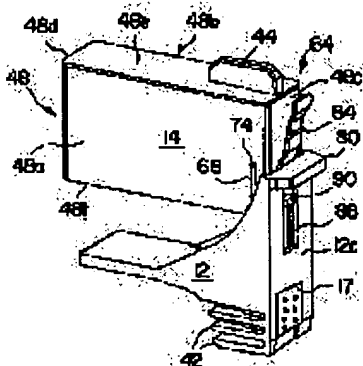
(30)Priority

Priority number : **1999 413442** Priority date : **06.10.1999** Priority country : **US****(54) INK JET PEN, REPLACEABLE INK CARTRIDGE USED THEREIN, AND
REPLACING METHOD FOR INK CARTRIDGE**

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an ink jet pen equipped with a cartridge main body having a printing head and an ink cartridge detachable and replaceable with respect to the cartridge main body.

SOLUTION: At least one elongated recessed part and at least one projected part are arranged on the mutually opposed surfaces of a cartridge main body (12, 20, 208, 366) and an ink cartridge (14, 22, 24, 26, 28, 202, 300, 302, 304, 306, 442) and can be engaged with each other in order to guide the ink cartridge to a desired position with respect to the cartridge main body to arrange the same.



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CLAIMS

[Claim(s)]

[Claim 1] It has the cartridge body which has a print head, and an exchangeable ink cartridge. Said cartridge body and said ink cartridge It is the ink jet pen which equipped the field which faces mutually with at least one long and slender crevice and at least one heights which have a shaft parallel to a longitudinal direction. Since said ink cartridge is substantially guided in accordance with an parallel guide shaft at least with said crevice shaft so that said ink cartridge may be arranged to said cartridge body in a desired location In order to be engaged mutually and to hold said ink cartridge in a desired location to said cartridge body, said at least one crevice and said at least one heights The ink jet pen for which the latch member connected to this ink cartridge engages [said some of cartridge bodies and].

[Claim 2] The ink jet pen according to claim 1 further equipped with the energization member which energizes said latch member which engages with said some of cartridge bodies.

[Claim 3] The ink jet pen according to claim 1 with which said at least one crevice consists of long and slender slots, this slot extends towards the 2nd part of this ink cartridge from the 1st part of said ink cartridge, said at least one heights consist of long and slender protruding lines, and this protruding line extends towards the 1st part of this cartridge body from the 2nd part of said cartridge body.

[Claim 4] The ink jet pen according to claim 3 from which the width of face of said long and slender slot changes so that the 1st part of said ink cartridge may become larger than the 2nd part of this ink cartridge, and said long and slender protruding line changes so that the 2nd part of said cartridge body may become larger than the 1st part of this cartridge body.

[Claim 5] The ink jet pen according to claim 1 with which said at least one crevice consists of long and slender slots, this slot extends towards the 1st part of this cartridge body from the 2nd part of said cartridge body, said at least one heights consist of long and slender protruding lines, and this protruding line extends towards the 2nd part of this ink cartridge from the 1st part of said ink cartridge.

[Claim 6] The ink jet pen according to claim 5 from which the width of face of said long and slender slot changes so that the 2nd part of said cartridge body may become larger than the 1st part of this cartridge body, and said long and slender protruding line changes so that the 1st part of said ink cartridge may become larger than the 2nd part of this ink cartridge.

[Claim 7] The ink jet pen according to claim 1 arranged in the field where at least two crevices and at least two heights face mutually [said ink cartridge and said cartridge body].

[Claim 8] The ink jet pen [equipped with covering in which removal to re-fill up said ink cartridge with ink is possible] according to claim 1.

[Claim 9] The ink jet pen [equipped with covering which has a port to re-fill up said ink cartridge with ink] according to claim 1.

[Claim 10] The phase of offering the cartridge body which has a print head, and an exchangeable ink cartridge, In order to hold said ink cartridge in said cartridge body so that the ink in said ink cartridge may be open for free passage with said print head The phase to which said ink cartridge is moved to said cartridge body, and in order to hold said ink cartridge in a desired location to said cartridge body Consist of a phase with which the latch member connected to said some of cartridge bodies at said ink cartridge is made to engage. It is the approach of exchanging the ink cartridge of an ink jet pen. Said cartridge body and said ink cartridge It has at least one long and slender crevice which has a shaft parallel to a longitudinal direction, and this crevice and at least one heights which can be engaged. The exchange approach of an ink cartridge that the direction to which said ink cartridge is moved, making said crevice and heights engaged is an parallel direction substantially at least to said crevice shaft.

[Claim 11] The exchange approach of an ink cartridge according to claim 10 further equipped with the energization member to which said cartridge body energizes said latch member which engages with these some bodies.

[Claim 12] The exchange approach of an ink cartridge according to claim 10 that said at least one crevice consists of long and slender slots, this slot extends towards the 2nd part of this ink cartridge from the 1st part of said ink cartridge, said at least one heights consist of long and slender protruding lines, and this protruding line extends towards the 1st part of this cartridge body from the 2nd part of said cartridge body.

[Claim 13] The exchange approach of an ink cartridge according to claim 12 that the width of

face of said long and slender slot changes so that the 1st part of said ink cartridge may become larger than the 2nd part of this ink cartridge, and said long and slender protruding line changes so that the 2nd part of said cartridge body may become larger than the 1st part of this cartridge body.

[Claim 14] The exchange approach of an ink cartridge according to claim 10 that said at least one crevice consists of long and slender slots, this slot extends towards the 1st part of this cartridge body from the 2nd part of said cartridge body, said at least one heights consist of long and slender protruding lines, and this protruding line extends towards the 2nd part of this ink cartridge from the 1st part of said ink cartridge.

[Claim 15] The exchange approach of an ink cartridge according to claim 14 that the width of face of said long and slender slot changes so that the 2nd part of said cartridge body may become larger than the 1st part of this cartridge body, and said long and slender protruding line changes so that the 1st part of said ink cartridge may become larger than the 2nd part of this ink cartridge.

[Claim 16] The exchange approach of an ink cartridge according to claim 10 further equipped with the phase which said ink cartridge demounts, and is equipped with possible covering, demounts said covering from said ink cartridge, and is re-filled up with ink in said ink cartridge.

[Claim 17] The exchange approach of an ink cartridge according to claim 10 further equipped with the phase re-filled up with ink in said ink cartridge when said ink cartridge is equipped with covering which has a port for ink restoration and supplies ink in said ink cartridge from said port for ink restoration.

[Claim 18] It is used for the ink jet pen of the type which has a semipermanent or eternal cartridge body equipped with a print head. The body section which contains the ink which is the exchangeable ink cartridge attached in said cartridge body, and formed the reservoir, and was ****(ed) by the beginning in said reservoir, The handle formed by the upper part of said body section, and the ratchet mechanism which is formed by the flank of said body section and engages with the latch section of said cartridge body, The exit port arranged so that it may be open for free passage with said print head when it is the exit port which is formed by said body section and is open for free passage with said reservoir and the ink cartridge concerned is attached in said cartridge body, In accordance with a perpendicular longitudinal shaft, it aligns substantially substantially [the ink cartridge concerned]. And it has the long and slender structure formed by one or more external surface of the ink cartridge concerned. In case the ink cartridge concerned is attached in said cartridge body Said structures are one or more long and slender parts of said cartridge body, and they are arranged so that the long and slender part and the engagement which have a shaft parallel to a longitudinal direction may be possible. The exchangeable ink cartridge which the ink cartridge concerned moves and by which the ink cartridge concerned is arranged at least possible [a guide] to said cartridge body in an parallel direction in a desired location at the beginning as substantially as the shaft of said long and slender part.

[Claim 19] The ink cartridge according to claim 18 to which said long and slender structure equipped the both sides of said body section with at least two long and slender crevices.

[Claim 20] The ink cartridge according to claim 18 to which said long and slender structure equipped the both sides of said body section with at least two long and slender heights.

[Claim 21] The ink cartridge according to claim 18 which is the finger part to which said ratchet mechanism is arranged at the lever section which extended from the leg and this leg to the upper part, and was energized by the method of outside, and this lever section, and extends to the method of outside, and was equipped with the finger part which engages with the latch section of

said cartridge body.

[Claim 22] It is the ink cartridge according to claim 18 by which it is a strong finger part substantially and had the finger part to which said ratchet mechanism extends to the method of outside, and which engages with the latch section of said cartridge body, and said handle of the ink cartridge concerned is the lower part section of the opposite side, and the energization member was prepared between said cartridge bodies and ink cartridges concerned.

[Claim 23] The ink cartridge according to claim 22 which said energization member becomes from a coil spring.

[Claim 24] The ink cartridge according to claim 18 which demounted since it was re-filled up with ink, and was equipped with possible covering.

[Claim 25] The ink cartridge [equipped with covering which has a port for ink restoration for being re-filled up with ink] according to claim 18.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to an ink jet pen and its configuration member about an ink jet printer.

[0002]

[Description of the Prior Art] A thermal ink jet printer is coming to incorporate the eternal or semipermanent ink jet pen which has an exchangeable ink cartridge. Ink jet pens are an exchangeable ink cartridge and an eternal or semipermanent configuration member, and, generally are characterized in the point of having a TAB circuit and the cartridge body which has a print head. While leading ink to a print head from an ink cartridge, the ink filter which filters this is usually prepared in the lower part edge of an ink cartridge. If the ink in an ink cartridge is exhausted, the life of an ink jet pen will be prolonged by exchanging the exhausted ink cartridge for a new ink cartridge.

[0003]

[Problem(s) to be Solved by the Invention] It is important to operate an ink jet pen so that a new ink cartridge may be held appropriately in a cartridge body. When not operated appropriately, the air into ink leakage and an ink cartridge enters, and other problems accompanying exchange of an ink cartridge arise.

[0004] Therefore, in this field, a configuration member which is used with an ink jet pen and by which the ink jet pen has been improved is desired.

[0005] Other purposes of this invention are offering the ink jet pen with which the type equipped with the exchangeable ink cartridge has been improved.

[0006] The further purpose of this invention is offering the improved ink cartridge.

[0007] Another purpose of this invention is offering the device equipped with the above-mentioned property which enables offer of the ink jet pen which exchanges ink cartridges easily and has the improved dependability and the engine performance.

[0008] Still more nearly another purpose of this invention is offering the device equipped with the above-mentioned property with a simple sufficient configuration and user-friendliness.

[0009] Other purposes of this invention are offering the approach for prolonging the life of an ink jet pen.

[0010] The purpose of further others of this invention is offering the approach of exchanging the

ink cartridge of an ink jet pen.

[Means for Solving the Problem]

[0011] In the purpose and advantage of above-mentioned and others, this invention relates to the improved ink jet pen.

[0012] In the suitable embodiment of this invention, an ink jet pen equips the cartridge body which has a print head, and a cartridge body with the exchangeable ink cartridge arranged movable. The long and slender crevice and the heights which collaborate and act on an ink cartridge and a cartridge body are prepared. A crevice and heights can be engaged in order to arrange an ink cartridge possible [a guide] in the location of a request of a cartridge body.

[0013] This invention relates to the approach of exchanging the ink cartridge of an ink jet pen again.

[0014] The approach concerning this invention is equipped with the phase of offering the cartridge body which has a print head, and an exchangeable ink cartridge, in the suitable embodiment. A cartridge body and an ink cartridge collaborate and have mutually the crevice and heights which can be engaged. A cartridge body and an ink cartridge can be displaced relatively so that the crevice and heights may be engaged and an ink cartridge may be held in a cartridge body, consequently the ink in an ink cartridge opens them for free passage with a print head.

[0015] This invention is an ink cartridge used for the ink jet pen of the type which has the semipermanent or eternal cartridge body equipped with the print head further, and relates to the ink cartridge attached in the above-mentioned cartridge body exchangeable.

[0016] An exchangeable ink cartridge is equipped with the structure which was formed by the body section which forms a reservoir and contains ink in this reservoir, and this body section, aligned substantially in accordance with the perpendicular longitudinal shaft substantially [a reservoir, an exit port open for free passage, and an ink cartridge], and was formed by one or more external surface of an ink cartridge in the suitable embodiment. In case an ink cartridge is attached in a cartridge body, the above-mentioned exit port is arranged so that it may be open for free passage with a print head. In case an ink cartridge is attached in a cartridge body, the above-mentioned structure of an ink cartridge is arranged so that one or more parts of a cartridge body and engagement may be possible. In case an ink cartridge is attached in a cartridge body by such engagement, an ink cartridge is arranged possible [a guide] to a cartridge body by it in a desired location.

[0017] This invention has the advantage which can exchange the ink cartridge of an ink jet pen easily.

[0018] By referring to detailed explanation with an attached drawing, the further advantage of this invention will become clear. An accompanying drawing is not drawn with a fixed scale, and the same notation is given to the same element in two or more drawings.

[0019]

[Embodiment of the Invention] This invention relates to the ink jet pen of the type which has a disposable component and an eternal or semipermanent component. The component of an ink jet pen constitutes a configuration advantageous to exchanging a disposable component easily. A component including the eternal or semipermanent cartridge body 12 is indicated to be the ink jet pen 10 to drawing 1 - drawing 4 . The cartridge body 12 can be attached in the exchangeable ink cartridge 14 which supplies ink to the ink jet print head 16 connected to a TAB circuit like a circuit 17.

[0020] The cartridge body 12 is good also as a configuration holding a single ink cartridge, or

good also as a configuration holding the ink cartridge of color ink which is many ink cartridges and is preferably different. In the case of the single ink cartridge 14, the cartridge body 12 is preferably equipped with the single print head 16 close to the lowest side 18 located in the opposite side of an ink cartridge 14.

[0021] As shown in drawing 5 - drawing 9, one or more cartridge bodies 20 which are equipped with the print heads 30, 32, 34, and 36 of a large number connected to many ink cartridges 22, 24, 26, and 28 and a TAB circuit, or flexible circuits 37, 38, 39, and 40 in the case of the a large number cartridge of the same color or a multicolor cartridge may be established.

[0022] The embodiment of drawing 10 - drawing 13 shows the single ink cartridge which has two or more separate ink chambers. The number of ink chambers has three pieces or four desirable pieces, each ink chamber is equipped with the ink of a different color, and a cartridge body has one print head to each ink color.

[0023] It is desirable that heat is removed from the print head attached in the cartridge body by printing actuation of high quality at high speed. this constitutes a cartridge body with aluminum, stainless steel, zinc, other metals, and a thermally conductive metal like an alloy -- and/or, what fin 42' to form the thermally conductive fin 42 in the cartridge body 12, or for conduction and the convection current remove heat from a print head is prepared in the cartridge body 20 for (refer to drawing 7) may attain. An ink cartridge 14 is usually made from polyethylene or a thermoplastic polymer ingredient like polypropylene, and such a polymer ingredient has corrosion resistance to ink.

[0024] As shown in drawing 1 - drawing 4, the exchangeable ink cartridge 14 is equipped with the body section 48 which has the upper part in which the handle 44 (or 46) was formed and side faces 48a and 48b, front 48c, 48d of rear faces, top-face 48e, and 48f of bases. A handle 44 (or 46) is located in top-face 48e.

[0025] an outlet -- a conduit or a port 50 is established in 48f of bases of the body section 48, and is open for free passage with the interior of the body section 48. In order to supply ink to a print head, a port 50 is arranged so that it may be open for free passage with a print head 16 with a needle valve. Preferably, a filter material like the form for filtering the ink transported to a print head 16 from an ink cartridge 14 is had or prepared in an exit port 50.

[0026] The seal of the exit port 50 may be carried out in the beginning by the film or the elastomer septum which was able to open the hole beforehand which can be destroyed. In case an ink cartridge 14 is laid and attached in the cartridge body 12 so that it may be open for free passage with a print head 16, the above-mentioned film is torn by the ink needle. The needle valve assembly explained to a detail in the following may be held and laid in the crevice 54 of the cartridge body 12. Ink leakage is prevented by seal like O ring 56 arranged to the crevice 54 in case a needle valve assembly is attached in a cartridge body (refer to drawing 3).

[0027] The cartridge body 12 and an ink cartridge 14 are equipped with the heights and the crevice which can be engaged mutually so that it may be easy to exchange the exhausted ink cartridge for a new ink cartridge. The cartridge body 12 is equipped with heights (protruding line) like the guide rails 58 and 60 of the pair preferably prepared in the insides 64 and 66 which both sides 12a and 12b of the cartridge body 12 counter about this point (refer to drawing 3). Guide rails 58 and 60 are held in the guide slot established in each external surface of the both sides 48a and 48b of an ink cartridge 14, or a corresponding crevice like a slot 68 (refer to drawing 2). In case an ink cartridge 14 is inserted in the cartridge body 12, guide rails 58 and 60 and a slot 68 collaborate moving perpendicularly or linearly substantially, an ink cartridge 14 guides them, and, thereby, an ink cartridge 14 is correctly attached in the cartridge body 12 so

that the direction which can insert an ink cartridge 14 may be turned to to the cartridge body 12. [0028] When a cartridge 14 moves perpendicularly or linearly substantially, anchoring to body 12a of an ink cartridge and association to the crevice 54 of a port 50 become easy, consequently strong association of vapor-liquid is substantially formed between an ink cartridge 14 and body 12a. In case a cartridge 14 is inserted into a body 12, the original migration of the cartridge 14 in the direction met substantially is not shown in the shaft formed by guide rails 58 and 60 and/or the slot 68, and the absolute direction or absolute sense of a cartridge 14 is not shown [vocabulary / which is not the intention which limits this invention and is used about a cartridge 14 or a body 12 in the purpose of explanation / "perpendicular"]. Furthermore, it means [vocabulary / "substantially perpendicular"] that an ink cartridge 14 is attached in the cartridge body 12 by leaning a cartridge 14 to 10 or less degrees to the vertical axes in alignment with guide rails 58 and 60 and a slot 68. Usually, a cartridge 14 is leaned at the include angle of about 2 or less times from vertical axes.

[0029] A slot 68 may be arranged on the lobe 70 which could form the direct crevice in the ink cartridge 14, and could establish the slot 68, or was prepared in side faces 48a and 48b. A slot 68 may be arranged on the cartridge body 12, and guide rails 58 and 60 may be arranged to an ink cartridge 14. Moreover, while arranging a single guide rail 58 or single 60 to one flank of the cartridge body 12, a slot 68 may be arranged to the flank of another side of the cartridge body 12, and the single guide rail which engages with the slot which engages with the single guide rail of the cartridge body 12, and the slot of the cartridge body 12 may be prepared in the side face in which an ink cartridge 14 corresponds.

[0030] Preferably, the slot 68 is tapering off and is equipped with the 1st edge 72 where the width of face which has the width of face of about 5 - 8mm of abbreviation is wide, and the 2nd edge 74 where the width of face which has the width of face of about 3 - 5mm of abbreviation is narrow. The overall lengths of each slot 68 are about 30 - 60mm of abbreviation preferably. Guide rails 58 and 60 suit exactly in a slot 68, and constitute a configuration which is held possible [sliding]. Each guide rails 58 and 60 are preferably equipped with the 1st edge 76 where width of face tapered off narrowly, and the 2nd edge 78 where width of face is wide. Since the 1st edge 72 of a slot 68 is broad, the 1st edge 76 where the width of face of a guide rail is narrow is easily held into it at the beginning. If a guide rail 58 and the 60 whole are held in a slot 68, without using other fasteners as an ink cartridge 14 is arranged in a suitable location to the cartridge body 12, a guide rail and a slot will form the engagement which it collaborated and was carried out exactly. However, other fasteners may be used as long as it is a request.

[0031] In this relation, front 12c connected to the both-sides sections 12a and 12b of the cartridge body 12 may be equipped with the lobe 80 which extends at right angles to the outside for engaging with the latch member 84 of an ink cartridge 14. In order to prepare the space for arranging the memory support arm 88 which extends from front 48c of an ink cartridge 14, and the memory device 90 attached in the memory support arm 88 by adhesives, a long and slender slot or a long and slender notch 86 may be preferably prepared in a front 12c center section. The above-mentioned memory device 90 receives, memorizes and/or transmits array information, ink information, and the information about a printer control system.

[0032] The latch member 84 is preferably equipped with the leg 92 of the lower part which extends from the front face of this to the method of outside while it is attached in front 48c, so that it may be best shown in drawing 4 . The upper lever section 94 extends up in the direction which went to a handle 44 or 46 mostly from the topmost part of the leg 92. The finger part 96 which is located in a before [the latch member 84] side, and extends to the method of outside

approaches the connection parts of the leg 92 and the lever section 94, and is prepared. An ink cartridge 14 can be demounted on the cartridge body 12, and a finger part 96 can engage with inferior-surface-of-tongue 80c of a lobe 80 so that it may be possible. It is desirable to make the reinforcement member 98 for reinforcement extend between the leg 92 and the lever section 94. By pressurizing the lever section 94 in the direction of the other side a handle 44 or 46, the leg 92 is energized towards front 48c. Thus, in order to hold an ink cartridge 14 in the cartridge body 12 still more certainly, it is arranged so that inferior-surface-of-tongue 80c of a lobe 80 and engagement of the latch member 84 may be possible.

[0033] By one actuation, the advantage attained by this invention can attach an ink cartridge 14 in the cartridge body 12, and demounts an ink cartridge 14 from the cartridge body 12, and is a possible thing. The above-mentioned description is given with a handle 44 or the configuration of 46. A handle 44 or 46 is equipped with curved rear-face 99a which has **** or notch 99b, and hole 99c penetrated in the thickness direction of a handle 46 in the suitable embodiment. It is, even if a user may insert add-on like a finger in hole 99c in order to hold an ink cartridge 14 certainly in the midst of anchoring of an ink cartridge, and removal, and it attaches other add-on like the thumb or other fingers to notch 99b of rear-face 99a, and it is **.

[0034] The ink jet pen 100 which are other embodiments of the ink jet pen 100 concerning this invention, and has many ink cartridges and many cartridge bodies is shown in drawing 5 - drawing 9. Each cartridge body is equipped with at least one print head. As mentioned above, the ink jet pen 100 is equipped with the print heads 30, 32, 34, and 36 connected to the cartridge body 20, ink cartridges 22, 24, 26, and 28 and a TAB circuit, or flexible circuits 37, 38, 39, and 40.

[0035] As for each ink cartridges 22, 24, 26, and 28, it is desirable to be [of an ink cartridge 14] a configuration and that it is substantially the same. Therefore, a cartridge 22 is equipped with the body section 102 which has a handle 103, an exit port 110, and the latch member 118. Ink cartridges 24, 26, and 28 are also the same configurations, and are equipped with handles 105, 107, and 109, exit ports 112, 114, and 116, and the body sections 104, 106, and 108 that have the latch members 120, 122, and 124, respectively. Ports 110-116 may be held in crevice 54' of the cartridge body 20 so that a port 50 may be held in a crevice 54 with a seal like O ring 56 (refer to drawing 3).

[0036] As furthermore shown in drawing 7 and drawing 8, the cartridge body 20 is equipped with the body section 126 which constitutes the configuration which holds an ink cartridge 22, and the body section 128 which constitutes the configuration which holds ink cartridges 24, 26, and 28. Although the body sections 126 and 128 may be separated, it is desirable that fin 42' connects firmly mutually.

[0037] The body section 126 is equipped with the side attachment walls 130 and 132 which face insides 134 and 136 mutually, respectively, and an ink cartridge 22 is arranged among these side attachment walls. In order that guide rails 138 and 140 (the same configuration as guide rails 58 and 60 is accomplished) may engage with the corresponding slot 142 (the same configuration as a slot 68 is accomplished), it is formed in the fields 134 and 136 of each ** where a cartridge body counters, respectively.

[0038] Similarly, the body section 128 is equipped with side attachment walls 144, 146, 148, and 150. An ink cartridge 24 is arranged between the field 152 of a side attachment wall 144, and the field 154 of a side attachment wall 146. An ink cartridge 26 is arranged between the field 156 of a side attachment wall 146, and the field 158 of a side attachment wall 148. An ink cartridge 28 is arranged between the field 160 of a side attachment wall 148, and the field 162 of a side

attachment wall 150. In order that guide rails 164 and 166 (the same configuration as guide rails 58 and 60 is accomplished) may engage with the corresponding slot 168 (the same configuration as a slot 68 is accomplished), it is formed in the fields 152 and 154 of each ** where the cartridge body 24 counters, respectively (refer to drawing 9). In order that the guide rails 170 and 172 which constitute the same configuration may engage with the corresponding slot 174, it is formed in each fields 156 and 158 of the both sides of the cartridge body 26, respectively. [0039] formed in each fields 160 and 162 of both sides where the cartridge body 28 counters, respectively in order that guide rails 176 and 178 may engage with the corresponding slot 180 As shown in drawing 9 , as for slots 168, 174, and 180, being arranged alternately at juxtaposition is desirable. The sets 164 and 166 of a corresponding guide rail, 170, and 172, 176 and 178 are arranged alternately similarly at juxtaposition, and each guide-rail set is arranged so that it may not be located on a single flat surface parallel to these. This prevents conveniently arranging an ink cartridge to a corresponding print head in the location which did not make a mistake in being desirable. For example, ink cartridges 24, 26, and 28 are preferably equipped with the ink of a different color. By arranging in the location which mistook the ink cartridge to the print head, the ink of a color which was mistaken through the print head will be distributed. Arranging in the location which mistook the ink cartridge is prevented by preparing a slot and a guide rail so that the ink cartridge concerned may be held in the slot of an ink cartridge, and the space of the cartridge body which has the guide rail which has a relation corresponding to the right. [0040] The body section 126 has a lobe 182 and the body section 128 has a lobe 184 (refer to drawing 7). Lobes 182 and 184 constitute the preferably same configuration as the lobe 80 which engages with the latch members 118, 120, 122, and 124 of ink cartridges 22, 24, 26, and 28. Each latch members 118-124 are good also as the same configuration as the latch member 84. As the memory support arm 88 and the memory device 90 were already explained, in order to offer the space for exchanging the memory device attached in memory support arm 88' (refer to drawing 6) and this, a long and slender slot or long and slender notches 186 and 188 are prepared in the center section of the front face of the body sections 126 and 128. [0041] Drawing 10 - drawing 13 show the ink jet pen 200 of the embodiment of further others concerning this invention. The ink jet pen 200 is equipped with the exchangeable ink cartridge 202 which has a handle 204 and the body section 206. As for an ink cartridge 202, it is desirable to have some ink chambers inside, and each ink chamber is equipped with the ink of a different color. Preferably, an ink cartridge 202 is equipped with 3 or four ink chambers. [0042] The body section 206 of an ink cartridge 202 is held in the cartridge body 208. A cartridge body has fin 42" and two or more print heads. The print head shown by 210 is connected to a TAB circuit or a flexible circuit 212. The number of print heads is equivalent to the number of ink chambers, i.e., the number of ink colors, and one print head is prepared to each ink color. When arranging each print head and each ink chamber open for free passage, a suitable exit port or a suitable filter is prepared similarly. [0043] The slot 214 equivalent to a slot 68 is formed in the insides 216 and 218 which side attachment walls 220 and 222 counter. A slot 214 holds the guide rail 224 equivalent to guide rails 58 and 60, and is arranged at the both sides 226 and 228 of the body section 206. [0044] In order to engage with a hole 232, as for the latch member 230, it is desirable to be arranged in the upper part of the body section 206. From the topmost part of the last side attachment wall 236 of the cartridge body 208, a hole 232 penetrates the lobe 234 which projects in the upper part, and is prepared. The latch member 230 is equipped with the leg 238 which extends from the top face 240 of an ink cartridge to the upper part and which is energized. The

ledge 242 located in the maximum upper limit of the leg 238 constitutes the configuration in which a hole 232 and engagement are possible. When a user makes the force act on the contact surface 244 which extends from the part close to the ledge 242 of the leg 238 to the upper part, a ledge 242 is sampled from a hole 232.

[0045] Drawing 14 - drawing 18 show the ink jet pen of the embodiment of further others concerning this invention. As shown in drawing 14 and drawing 15, ink cartridges 300, 302, 304, and 306 have the body section equipped with the anterior part panels 308, 310, 312, and 314 and upper panels 316, 318, 320, and 322, and each upper panel is equipped with handles 324, 326, 328, and 330, respectively. Although further explained to a detail in the following, each anterior part panels 308, 310, 312, and 314 are equipped with the latch member or the finger part material 332, 334, 336, and 338 for having the memory support arms 309, 311, 313, and 315 of the pair in which memory modules 317, 319, 321, and 323 are attached, and making the latch section engage with a cartridge body.

[0046] In order to arrange a cartridge correctly on an ink jet pen, the keys 346, 348, and 350 connected with the color ink of a cartridge are formed in the posterior part panels 340, 342, and 344 of the body section of ink cartridges 300, 302, and 304. As for an ink cartridge 306, it is desirable that it is the cartridge of the black ink which has cyanogen, a Magenta, and a bigger reservoir than each ink cartridge of yellow. Therefore, since a cartridge 306 is settled only in one location in an ink jet pen, a notation does not need to show the specific location in which a cartridge 306 is held. However, as long as it is a request, a notation may show the specific location in which an ink cartridge 306 is held in an ink jet pen.

[0047] It is desirable that one or more keys 346, 348, and 350 are equipped with the strong projections 352, 354, and 356 that it is long and slender and substantially. Such a projection projects outside from panels 340, 342, and 344, respectively. The horizontal position, the vertical position, and/or width of face of projections 352, 354, and 356 may be changed so that the long and slender slots 358, 360, and 362 prepared in the posterior part panel 364 of the cartridge body 366 may be suited. In case a cartridge is arranged correctly and inserted into the cartridge body 366, as for the die length, the width of face, and/or the location of slots 358, 360, and 362, it is desirable to make it change with the cartridges of each color so that projections 352, 354, and 356 may engage with a slot certainly.

[0048] In case ink cartridges 300, 302, and 304 and/or 306 are inserted and attached in the cartridge body 366, in the time of insertion, ink cartridges 300, 302, and 304 and/or 306 are leaned with a bigger include angle than about 10 degrees to a cartridge body, and are inserted into the cartridge body 366 in a direction perpendicular to a real target which gave the definition above, or linear. Therefore, projections 352, 354, and 356 are also linearly guided at the beginning when a cartridge is inserted into a cartridge body within the long and slender slots 358 and 360 prepared in the cartridge body 366, and 362.

[0049] Based on drawing 17 and drawing 18, ink cartridges 300, 302, 304, and 306 are certainly held in the cartridge body 366, and the ratchet mechanism for supplying ink to print heads 368, 370, 372, and 374 is explained. As mentioned above, each anterior part panels 308, 310, 312, and 314 of cartridges 300, 302, 304, and 306 are equipped with a latch member or the finger part material 332, 334, 336, and 338, respectively. These latch member or finger part material engages with the latch sections 376, 378, 380, and 382 to which the body section 366 corresponds. An anterior part panel is equipped with the memory support arms 309, 311, 313, and 315 which hold memory modules 317, 319, 321, and 323, respectively again (refer to drawing 14). In case cartridges 300, 302, 304, and 306 are perpendicularly arranged to the

cartridge body 366 and are inserted in the interior, ** ON of a memory module, a support arm, and the finger part is carried out into the slots 377, 379, and 381 of the anterior part panel of the cartridge body 366, and 383, and a memory module is electrically connected to a printer. In order that the latch sections 376, 378, 380, and 382 of the cartridge body 366 may engage with the latch members 332, 334, 336, and 338 of a cartridge, respectively, it is good as the shape of ledged or a shoulder. Although it is desirable to have the shape of a strong finger substantially as for a latch member, the finger part energized elastically may be used. The further advantage of the support arm holding a memory module is that cartridges 300, 302, 304, and 306 are easily guided in the cartridge body 366, in case a finger part and the latch section are engaged.

[0050] In order to make finger parts 332, 334, 336, and 338 engage with the latch sections 376, 378, 380, and 382 certainly, it is desirable to energize ink cartridges 300, 302, 304, and 306 so that friction engagement may exist between a finger part and the latch section. An ink cartridge is energized with the energization member or springs 384, 386, 388, and 390 which were attached in either the cartridge body or the ink cartridge. Although an energization member can be made with various ingredients and it is not limited to a coil spring, an elastic form object, a flat spring, etc., you may have various configurations containing these. It is desirable to turn the energization members 384, 386, 388, and 390 to the cartridge body of the opposite side of the edge of a cartridge or the latch sections 376, 378, 380, and 382, and especially to arrange them. In case a cartridge is inserted into a cartridge body, in order to make a latch member engage with the latch section, a pressure is made to act on each parts 400, 402, 404, and 406 of handles 324, 326, 328, and 330. In order to cancel engagement in a latch member and the latch section, a pressure is made to act on each parts 408, 410, 412, and 414 of handles 324, 326, 328, and 330, and a part for die length effective in releasing the finger parts 332, 334, 336, and 338 of the energization members 384, 386, 388, and 390 from the latch sections 376, 378, 380, and 382 by this is pushed.

[0051] Each energization members 384, 386, 388, and 390 attached in the cylinder projections 387, 389, 391, and 393 at drawing 18 are shown. The cylinder projections 387, 389, 391, and 393 are formed as a part of lower part 395 of the cartridge body 366, or are attached in this lower part 395. The location of the energization members 384, 386, 388, and 390 may arrange an energization member in the top section of the cartridge body 366, the posterior part panel 364, or the correspondence part of the ink cartridge itself rather than is important in this invention.

[0052] The cartridge body 366 is preferably equipped with the parallel reinforcing rib 420, and a reinforcing rib 420 is arranged between the auxiliary member and each cartridge which guide an ink cartridge to a cartridge body. In order to give sufficient width of face to a cartridge body inserting a cartridge in a cartridge body, the crossing reinforcing rib 422 perpendicular to a rib 420 may also be used. Reinforcing ribs 420 and 422 are preferably formed during manufacture of a cartridge body at the reinforcement insertion section 424 inserted into this cartridge body. It is the arrangement guide 426 connected to the ink needle valve assembly 430 of the insertion section 424, and it is desirable especially to form the energization members 384, 386, 388, and 390 in the insertion section 424 like the arrangement guide 426 of the letter of a projection which guides the inlet-port projection of the ink prepared in the ink cartridge. The ink needle valve assembly 430 has the bulb slide member 432 equipped with the bulb, and the slide member guide 434 which guides the slide member 432 possible [sliding] at the time of insertion of a cartridge.

[0053] The ink jet pen concerning this invention has the advantage which can avoid the common problem which encounters in case the exhausted ink cartridge can be exchanged easily and ink cartridges are exchanged. For example, in order to bend the seal member and other configuration

members of an ink jet pen or to avoid distorting, the guide rail and slot which were prepared in the ink cartridge and the cartridge body collaborate, and this is guided in order to demount the ink cartridge exhausted from the cartridge body. As well as this in case it attaches a new ink cartridge, a guide rail and a slot collaborate, and this is guided so that an ink cartridge may move linearly substantially in a cartridge body. While acting on a configuration member and deteriorating or damaging this by this, the bending stress which causes the leakage of a liquid or a gas is avoided. Moreover, since poor anchoring of the port to which ink is led from an ink cartridge is avoided, in case an ink cartridge is attached, it can also be prevented that air enters in an ink cartridge, and/or damage on the seal member of a cartridge body can also be prevented. [0054] In each above-mentioned embodiment, the ink in an ink cartridge is supplied first, and if the ink in an ink cartridge is exhausted and lost, it will be exchanged in an ink cartridge. You may make it supply ink to one or more ink cartridges again with various means as an embodiment replaced with such an embodiment. For example, as shown in drawing 19 , in order to re-fill up an ink cartridge with ink, a cap or covering 440 of an ink cartridge 442 is not fixed to side attachment walls 444, 446, 448, and 450 in the periphery section 452 of an ink cartridge 442 top, but it demounts from this periphery section and is good also as possible. It is [that a cap or covering 440 is also equipped with the adapter 454 equipped with one or more holes 456 which engage with one or more posts or projection 458 which projects from the inferior surface of tongue 460 of a cap or covering 440] good in order to make easy removal and anchoring of a cap or covering 440. In this embodiment, an adapter 454 is fixed and attached in the periphery section 452 of an ink cartridge 442 top by welding or adhesion, and a cap or covering 440 is demounted to an adapter 454, and is attached possible. A cap or covering 440 is demounted from an adapter 454, and it can be filled up with ink in an ink cartridge 442 from one or more holes 456 or the ink restoration holes 462.

[0055] furthermore, ink is re-filled up with other embodiments into an ink cartridge 442 continuously or intermittently from an ink reservoir -- as -- covering 440 -- replacing with -- supply -- the covering 464 equipped with the inlet-port port 466 of the ink attached in the conduit 468 may be used (refer to drawing 20). In this embodiment, it may fix to the periphery section 452 of an ink cartridge 442 top directly, and covering 464 may be attached in it without needing an adapter (refer to drawing 19). the ink reservoir in the place distant from the ink cartridge -- the interior of a printer -- you may arrange -- or the inside of an ink container separate from a printer -- arranging -- this ink container and a printer -- the object for ink supply -- you may connect with a conduit. However, it is desirable not to attach such an ink reservoir in the movable base for moving an ink cartridge and a cartridge body during printing actuation.

[0056] It should be understood that various corrections or modification are possible without showing the above-mentioned explanation about the embodiment of this invention only as a purpose of instantiation, and deviating from the intention and range of this invention of a publication to a claim.

TECHNICAL FIELD

[Field of the Invention] Especially this invention relates to an ink jet pen and its configuration member about an ink jet printer.

PRIOR ART

[Description of the Prior Art] A thermal ink jet printer is coming to incorporate the eternal or semipermanent ink jet pen which has an exchangeable ink cartridge. Ink jet pens are an exchangeable ink cartridge and an eternal or semipermanent configuration member, and, generally are characterized in the point of having a TAB circuit and the cartridge body which has a print head. While leading ink to a print head from an ink cartridge, the ink filter which filters this is usually prepared in the lower part edge of an ink cartridge. If the ink in an ink cartridge is exhausted, the life of an ink jet pen will be prolonged by exchanging the exhausted ink cartridge for a new ink cartridge.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] It is important to operate an ink jet pen so that a new ink cartridge may be held appropriately in a cartridge body. When not operated appropriately, the air into ink leakage and an ink cartridge enters, and other problems accompanying exchange of an ink cartridge arise.

[0004] Therefore, in this field, a configuration member which is used with an ink jet pen and by which the ink jet pen has been improved is desired.

[0005] Other purposes of this invention are offering the ink jet pen with which the type equipped with the exchangeable ink cartridge has been improved.

[0006] The further purpose of this invention is offering the improved ink cartridge.

[0007] Another purpose of this invention is offering the device equipped with the above-mentioned property which enables offer of the ink jet pen which exchanges ink cartridges easily and has the improved dependability and the engine performance.

[0008] Still more nearly another purpose of this invention is offering the device equipped with the above-mentioned property with a simple sufficient configuration and user-friendliness.

[0009] Other purposes of this invention are offering the approach for prolonging the life of an ink jet pen.

[0010] The purpose of further others of this invention is offering the approach of exchanging the ink cartridge of an ink jet pen.

MEANS

[Means for Solving the Problem]

[0011] In the purpose and advantage of above-mentioned and others, this invention relates to the improved ink jet pen.

[0012] In the suitable embodiment of this invention, an ink jet pen equips the cartridge body which has a print head, and a cartridge body with the exchangeable ink cartridge arranged movable. The long and slender crevice and the heights which collaborate and act on an ink cartridge and a cartridge body are prepared. A crevice and heights can be engaged in order to arrange an ink cartridge possible [a guide] in the location of a request of a cartridge body.

[0013] This invention relates to the approach of exchanging the ink cartridge of an ink jet pen again.

[0014] The approach concerning this invention is equipped with the phase of offering the cartridge body which has a print head, and an exchangeable ink cartridge, in the suitable embodiment. A cartridge body and an ink cartridge collaborate and have mutually the crevice and heights which can be engaged. A cartridge body and an ink cartridge can be displaced

relatively so that the crevice and heights may be engaged and an ink cartridge may be held in a cartridge body, consequently the ink in an ink cartridge opens them for free passage with a print head.

[0015] This invention is an ink cartridge used for the ink jet pen of the type which has the semipermanent or eternal cartridge body equipped with the print head further, and relates to the ink cartridge attached in the above-mentioned cartridge body exchangeable.

[0016] An exchangeable ink cartridge is equipped with the structure which was formed by the body section which forms a reservoir and contains ink in this reservoir, and this body section, aligned substantially in accordance with the perpendicular longitudinal shaft substantially [a reservoir, an exit port open for free passage, and an ink cartridge], and was formed by one or more external surface of an ink cartridge in the suitable embodiment. In case an ink cartridge is attached in a cartridge body, the above-mentioned exit port is arranged so that it may be open for free passage with a print head. In case an ink cartridge is attached in a cartridge body, the above-mentioned structure of an ink cartridge is arranged so that one or more parts of a cartridge body and engagement may be possible. In case an ink cartridge is attached in a cartridge body by such engagement, an ink cartridge is arranged possible [a guide] to a cartridge body by it in a desired location.

[0017] This invention has the advantage which can exchange the ink cartridge of an ink jet pen easily.

[0018] By referring to detailed explanation with an attached drawing, the further advantage of this invention will become clear. An accompanying drawing is not drawn with a fixed scale, and the same notation is given to the same element in two or more drawings.

[0019]

[Embodiment of the Invention] This invention relates to the ink jet pen of the type which has a disposable component and an eternal or semipermanent component. The component of an ink jet pen constitutes a configuration advantageous to exchanging a disposable component easily. A component including the eternal or semipermanent cartridge body 12 is indicated to be the ink jet pen 10 to drawing 1 - drawing 4 . The cartridge body 12 can be attached in the exchangeable ink cartridge 14 which supplies ink to the ink jet print head 16 connected to a TAB circuit like a circuit 17.

[0020] The cartridge body 12 is good also as a configuration holding a single ink cartridge, or good also as a configuration holding the ink cartridge of color ink which is many ink cartridges and is preferably different. In the case of the single ink cartridge 14, the cartridge body 12 is preferably equipped with the single print head 16 close to the lowest side 18 located in the opposite side of an ink cartridge 14.

[0021] As shown in drawing 5 - drawing 9, one or more cartridge bodies 20 which are equipped with the print heads 30, 32, 34, and 36 of a large number connected to many ink cartridges 22, 24, 26, and 28 and a TAB circuit, or flexible circuits 37, 38, 39, and 40 in the case of the a large number cartridge of the same color or a multicolor cartridge may be established.

[0022] The embodiment of drawing 10 - drawing 13 shows the single ink cartridge which has two or more separate ink chambers. The number of ink chambers has three pieces or four desirable pieces, each ink chamber is equipped with the ink of a different color, and a cartridge body has one print head to each ink color.

[0023] It is desirable that heat is removed from the print head attached in the cartridge body by printing actuation of high quality at high speed. this constitutes a cartridge body with aluminum, stainless steel, zinc, other metals, and a thermally conductive metal like an alloy -- and/or, what

fin 42' to form the thermally conductive fin 42 in the cartridge body 12, or for conduction and the convection current remove heat from a print head is prepared in the cartridge body 20 for (refer to drawing 7) may attain. An ink cartridge 14 is usually made from polyethylene or a thermoplastic polymer ingredient like polypropylene, and such a polymer ingredient has corrosion resistance to ink.

[0024] As shown in drawing 1 - drawing 4, the exchangeable ink cartridge 14 is equipped with the body section 48 which has the upper part in which the handle 44 (or 46) was formed and side faces 48a and 48b, front 48c, 48d of rear faces, top-face 48e, and 48f of bases. A handle 44 (or 46) is located in top-face 48e.

[0025] an outlet -- a conduit or a port 50 is established in 48f of bases of the body section 48, and is open for free passage with the interior of the body section 48. In order to supply ink to a print head, a port 50 is arranged so that it may be open for free passage with a print head 16 with a needle valve. Preferably, a filter material like the form for filtering the ink transported to a print head 16 from an ink cartridge 14 is had or prepared in an exit port 50.

[0026] The seal of the exit port 50 may be carried out in the beginning by the film or the elastomer septum which was able to open the hole beforehand which can be destroyed. In case an ink cartridge 14 is laid and attached in the cartridge body 12 so that it may be open for free passage with a print head 16, the above-mentioned film is torn by the ink needle. The needle valve assembly explained to a detail in the following may be held and laid in the crevice 54 of the cartridge body 12. Ink leakage is prevented by seal like O ring 56 arranged to the crevice 54 in case a needle valve assembly is attached in a cartridge body (refer to drawing 3).

[0027] The cartridge body 12 and an ink cartridge 14 are equipped with the heights and the crevice which can be engaged mutually so that it may be easy to exchange the exhausted ink cartridge for a new ink cartridge. The cartridge body 12 is equipped with heights (protruding line) like the guide rails 58 and 60 of the pair preferably prepared in the insides 64 and 66 which both sides 12a and 12b of the cartridge body 12 counter about this point (refer to drawing 3). Guide rails 58 and 60 are held in the guide slot established in each external surface of the both sides 48a and 48b of an ink cartridge 14, or a corresponding crevice like a slot 68 (refer to drawing 2). In case an ink cartridge 14 is inserted in the cartridge body 12, guide rails 58 and 60 and a slot 68 collaborate moving perpendicularly or linearly substantially, an ink cartridge 14 guides them, and, thereby, an ink cartridge 14 is correctly attached in the cartridge body 12 so that the direction which can insert an ink cartridge 14 may be turned to to the cartridge body 12.

[0028] When a cartridge 14 moves perpendicularly or linearly substantially, anchoring to body 12a of an ink cartridge and association to the crevice 54 of a port 50 become easy, consequently strong association of vapor-liquid is substantially formed between an ink cartridge 14 and body 12a. In case a cartridge 14 is inserted into a body 12, the original migration of the cartridge 14 in the direction met substantially is not shown in the shaft formed by guide rails 58 and 60 and/or the slot 68, and the absolute direction or absolute sense of a cartridge 14 is not shown [vocabulary / which is not the intention which limits this invention and is used about a cartridge 14 or a body 12 in the purpose of explanation / "perpendicular"]. Furthermore, it means [vocabulary / "substantially perpendicular"] that an ink cartridge 14 is attached in the cartridge body 12 by leaning a cartridge 14 to 10 or less degrees to the vertical axes in alignment with guide rails 58 and 60 and a slot 68. Usually, a cartridge 14 is leaned at the include angle of about 2 or less times from vertical axes.

[0029] A slot 68 may be arranged on the lobe 70 which could form the direct crevice in the ink cartridge 14, and could establish the slot 68, or was prepared in side faces 48a and 48b. A slot 68

may be arranged on the cartridge body 12, and guide rails 58 and 60 may be arranged to an ink cartridge 14. Moreover, while arranging a single guide rail 58 or single 60 to one flank of the cartridge body 12, a slot 68 may be arranged to the flank of another side of the cartridge body 12, and the single guide rail which engages with the slot which engages with the single guide rail of the cartridge body 12, and the slot of the cartridge body 12 may be prepared in the side face in which an ink cartridge 14 corresponds.

[0030] Preferably, the slot 68 is tapering off and is equipped with the 1st edge 72 where the width of face which has the width of face of about 5 - 8mm of abbreviation is wide, and the 2nd edge 74 where the width of face which has the width of face of about 3 - 5mm of abbreviation is narrow. The overall lengths of each slot 68 are about 30 - 60mm of abbreviation preferably. Guide rails 58 and 60 suit exactly in a slot 68, and constitute a configuration which is held possible [sliding]. Each guide rails 58 and 60 are preferably equipped with the 1st edge 76 where width of face tapered off narrowly, and the 2nd edge 78 where width of face is wide. Since the 1st edge 72 of a slot 68 is broad, the 1st edge 76 where the width of face of a guide rail is narrow is easily held into it at the beginning. If a guide rail 58 and the 60 whole are held in a slot 68, without using other fasteners as an ink cartridge 14 is arranged in a suitable location to the cartridge body 12, a guide rail and a slot will form the engagement which it collaborated and was carried out exactly. However, other fasteners may be used as long as it is a request.

[0031] In this relation, front 12c connected to the both-sides sections 12a and 12b of the cartridge body 12 may be equipped with the lobe 80 which extends at right angles to the outside for engaging with the latch member 84 of an ink cartridge 14. In order to prepare the space for arranging the memory support arm 88 which extends from front 48c of an ink cartridge 14, and the memory device 90 attached in the memory support arm 88 by adhesives, a long and slender slot or a long and slender notch 86 may be preferably prepared in a front 12c center section. The above-mentioned memory device 90 receives, memorizes and/or transmits array information, ink information, and the information about a printer control system.

[0032] The latch member 84 is preferably equipped with the leg 92 of the lower part which extends from the front face of this to the method of outside while it is attached in front 48c, so that it may be best shown in drawing 4 . The upper lever section 94 extends up in the direction which went to a handle 44 or 46 mostly from the topmost part of the leg 92. The finger part 96 which is located in a before [the latch member 84] side, and extends to the method of outside approaches the connection parts of the leg 92 and the lever section 94, and is prepared. An ink cartridge 14 can be demounted on the cartridge body 12, and a finger part 96 can engage with inferior-surface-of-tongue 80c of a lobe 80 so that it may be possible. It is desirable to make the reinforcement member 98 for reinforcement extend between the leg 92 and the lever section 94. By pressurizing the lever section 94 in the direction of the other side a handle 44 or 46, the leg 92 is energized towards front 48c. Thus, in order to hold an ink cartridge 14 in the cartridge body 12 still more certainly, it is arranged so that inferior-surface-of-tongue 80c of a lobe 80 and engagement of the latch member 84 may be possible.

[0033] By one actuation, the advantage attained by this invention can attach an ink cartridge 14 in the cartridge body 12, and demounts an ink cartridge 14 from the cartridge body 12, and is a possible thing. The above-mentioned description is given with a handle 44 or the configuration of 46. A handle 44 or 46 is equipped with curved rear-face 99a which has **** or notch 99b, and hole 99c penetrated in the thickness direction of a handle 46 in the suitable embodiment. It is, even if a user may insert add-on like a finger in hole 99c in order to hold an ink cartridge 14 certainly in the midst of anchoring of an ink cartridge, and removal, and it attaches other add-on

like the thumb or other fingers to notch 99b of rear-face 99a, and it is **.

[0034] The ink jet pen 100 which are other embodiments of the ink jet pen 100 concerning this invention, and has many ink cartridges and many cartridge bodies is shown in drawing 5 - drawing 9. Each cartridge body is equipped with at least one print head. As mentioned above, the ink jet pen 100 is equipped with the print heads 30, 32, 34, and 36 connected to the cartridge body 20, ink cartridges 22, 24, 26, and 28 and a TAB circuit, or flexible circuits 37, 38, 39, and 40.

[0035] As for each ink cartridges 22, 24, 26, and 28, it is desirable to be [of an ink cartridge 14] a configuration and that it is substantially the same. Therefore, a cartridge 22 is equipped with the body section 102 which has a handle 103, an exit port 110, and the latch member 118. Ink cartridges 24, 26, and 28 are also the same configurations, and are equipped with handles 105, 107, and 109, exit ports 112, 114, and 116, and the body sections 104, 106, and 108 that have the latch members 120, 122, and 124, respectively. Ports 110-116 may be held in crevice 54' of the cartridge body 20 so that a port 50 may be held in a crevice 54 with a seal like O ring 56 (refer to drawing 3).

[0036] As furthermore shown in drawing 7 and drawing 8 , the cartridge body 20 is equipped with the body section 126 which constitutes the configuration which holds an ink cartridge 22, and the body section 128 which constitutes the configuration which holds ink cartridges 24, 26, and 28. Although the body sections 126 and 128 may be separated, it is desirable that fin 42' connects firmly mutually.

[0037] The body section 126 is equipped with the side attachment walls 130 and 132 which face insides 134 and 136 mutually, respectively, and an ink cartridge 22 is arranged among these side attachment walls. In order that guide rails 138 and 140 (the same configuration as guide rails 58 and 60 is accomplished) may engage with the corresponding slot 142 (the same configuration as a slot 68 is accomplished), it is formed in the fields 134 and 136 of each ** where a cartridge body counters, respectively.

[0038] Similarly, the body section 128 is equipped with side attachment walls 144, 146, 148, and 150. An ink cartridge 24 is arranged between the field 152 of a side attachment wall 144, and the field 154 of a side attachment wall 146. An ink cartridge 26 is arranged between the field 156 of a side attachment wall 146, and the field 158 of a side attachment wall 148. An ink cartridge 28 is arranged between the field 160 of a side attachment wall 148, and the field 162 of a side attachment wall 150. In order that guide rails 164 and 166 (the same configuration as guide rails 58 and 60 is accomplished) may engage with the corresponding slot 168 (the same configuration as a slot 68 is accomplished), it is formed in the fields 152 and 154 of each ** where the cartridge body 24 counters, respectively (refer to drawing 9). In order that the guide rails 170 and 172 which constitute the same configuration may engage with the corresponding slot 174, it is formed in each fields 156 and 158 of the both sides of the cartridge body 26, respectively.

[0039] formed in each fields 160 and 162 of both sides where the cartridge body 28 counters, respectively in order that guide rails 176 and 178 may engage with the corresponding slot 180 As shown in drawing 9 , as for slots 168, 174, and 180, being arranged alternately at juxtaposition is desirable. The sets 164 and 166 of a corresponding guide rail, 170, and 172, 176 and 178 are arranged alternately similarly at juxtaposition, and each guide-rail set is arranged so that it may not be located on a single flat surface parallel to these. This prevents conveniently arranging an ink cartridge to a corresponding print head in the location which did not make a mistake in being desirable. For example, ink cartridges 24, 26, and 28 are preferably equipped with the ink of a different color. By arranging in the location which mistook the ink cartridge to the print head, the

ink of a color which was mistaken through the print head will be distributed. Arranging in the location which mistook the ink cartridge is prevented by preparing a slot and a guide rail so that the ink cartridge concerned may be held in the slot of an ink cartridge, and the space of the cartridge body which has the guide rail which has a relation corresponding to the right.

[0040] The body section 126 has a lobe 182 and the body section 128 has a lobe 184 (refer to drawing 7). Lobes 182 and 184 constitute the preferably same configuration as the lobe 80 which engages with the latch members 118, 120, 122, and 124 of ink cartridges 22, 24, 26, and 28.

Each latch members 118-124 are good also as the same configuration as the latch member 84. As the memory support arm 88 and the memory device 90 were already explained, in order to offer the space for exchanging the memory device attached in memory support arm 88' (refer to drawing 6) and this, a long and slender slot or long and slender notches 186 and 188 are prepared in the center section of the front face of the body sections 126 and 128.

[0041] Drawing 10 - drawing 13 show the ink jet pen 200 of the embodiment of further others concerning this invention. The ink jet pen 200 is equipped with the exchangeable ink cartridge 202 which has a handle 204 and the body section 206. As for an ink cartridge 202, it is desirable to have some ink chambers inside, and each ink chamber is equipped with the ink of a different color. Preferably, an ink cartridge 202 is equipped with 3 or four ink chambers.

[0042] The body section 206 of an ink cartridge 202 is held in the cartridge body 208. A cartridge body has fin 42" and two or more print heads. The print head shown by 210 is connected to a TAB circuit or a flexible circuit 212. The number of print heads is equivalent to the number of ink chambers, i.e., the number of ink colors, and one print head is prepared to each ink color. When arranging each print head and each ink chamber open for free passage, a suitable exit port or a suitable filter is prepared similarly.

[0043] The slot 214 equivalent to a slot 68 is formed in the insides 216 and 218 which side attachment walls 220 and 222 counter. A slot 214 holds the guide rail 224 equivalent to guide rails 58 and 60, and is arranged at the both sides 226 and 228 of the body section 206.

[0044] In order to engage with a hole 232, as for the latch member 230, it is desirable to be arranged in the upper part of the body section 206. From the topmost part of the last side attachment wall 236 of the cartridge body 208, a hole 232 penetrates the lobe 234 which projects in the upper part, and is prepared. The latch member 230 is equipped with the leg 238 which extends from the top face 240 of an ink cartridge to the upper part and which is energized. The ledge 242 located in the maximum upper limit of the leg 238 constitutes the configuration in which a hole 232 and engagement are possible. When a user makes the force act on the contact surface 244 which extends from the part close to the ledge 242 of the leg 238 to the upper part, a ledge 242 is sampled from a hole 232.

[0045] Drawing 14 - drawing 18 show the ink jet pen of the embodiment of further others concerning this invention. As shown in drawing 14 and drawing 15, ink cartridges 300, 302, 304, and 306 have the body section equipped with the anterior part panels 308, 310, 312, and 314 and upper panels 316, 318, 320, and 322, and each upper panel is equipped with handles 324, 326, 328, and 330, respectively. Although further explained to a detail in the following, each anterior part panels 308, 310, 312, and 314 are equipped with the latch member or the finger part material 332, 334, 336, and 338 for having the memory support arms 309, 311, 313, and 315 of the pair in which memory modules 317, 319, 321, and 323 are attached, and making the latch section engage with a cartridge body.

[0046] In order to arrange a cartridge correctly on an ink jet pen, the keys 346, 348, and 350 connected with the color ink of a cartridge are formed in the posterior part panels 340, 342, and

344 of the body section of ink cartridges 300, 302, and 304. As for an ink cartridge 306, it is desirable that it is the cartridge of the black ink which has cyanogen, a Magenta, and a bigger reservoir than each ink cartridge of yellow. Therefore, since a cartridge 306 is settled only in one location in an ink jet pen, a notation does not need to show the specific location in which a cartridge 306 is held. However, as long as it is a request, a notation may show the specific location in which an ink cartridge 306 is held in an ink jet pen.

[0047] It is desirable that one or more keys 346, 348, and 350 are equipped with the strong projections 352, 354, and 356 that it is long and slender and substantially. Such a projection projects outside from panels 340, 342, and 344, respectively. The horizontal position, the vertical position, and/or width of face of projections 352, 354, and 356 may be changed so that the long and slender slots 358, 360, and 362 prepared in the posterior part panel 364 of the cartridge body 366 may be suited. In case a cartridge is arranged correctly and inserted into the cartridge body 366, as for the die length, the width of face, and/or the location of slots 358, 360, and 362, it is desirable to make it change with the cartridges of each color so that projections 352, 354, and 356 may engage with a slot certainly.

[0048] In case ink cartridges 300, 302, and 304 and/or 306 are inserted and attached in the cartridge body 366, in the time of insertion, ink cartridges 300, 302, and 304 and/or 306 are leaned with a bigger include angle than about 10 degrees to a cartridge body, and are inserted into the cartridge body 366 in a direction perpendicular to a real target which gave the definition above, or linear. Therefore, projections 352, 354, and 356 are also linearly guided at the beginning when a cartridge is inserted into a cartridge body within the long and slender slots 358 and 360 prepared in the cartridge body 366, and 362.

[0049] Based on drawing 17 and drawing 18, ink cartridges 300, 302, 304, and 306 are certainly held in the cartridge body 366, and the ratchet mechanism for supplying ink to print heads 368, 370, 372, and 374 is explained. As mentioned above, each anterior part panels 308, 310, 312, and 314 of cartridges 300, 302, 304, and 306 are equipped with a latch member or the finger part material 332, 334, 336, and 338, respectively. These latch member or finger part material engages with the latch sections 376, 378, 380, and 382 to which the body section 366 corresponds. An anterior part panel is equipped with the memory support arms 309, 311, 313, and 315 which hold memory modules 317, 319, 321, and 323, respectively again (refer to drawing 14). In case cartridges 300, 302, 304, and 306 are perpendicularly arranged to the cartridge body 366 and are inserted in the interior, ** ON of a memory module, a support arm, and the finger part is carried out into the slots 377, 379, and 381 of the anterior part panel of the cartridge body 366, and 383, and a memory module is electrically connected to a printer. In order that the latch sections 376, 378, 380, and 382 of the cartridge body 366 may engage with the latch members 332, 334, 336, and 338 of a cartridge, respectively, it is good as the shape of ledged or a shoulder. Although it is desirable to have the shape of a strong finger substantially as for a latch member, the finger part energized elastically may be used. The further advantage of the support arm holding a memory module is that cartridges 300, 302, 304, and 306 are easily guided in the cartridge body 366, in case a finger part and the latch section are engaged.

[0050] In order to make finger parts 332, 334, 336, and 338 engage with the latch sections 376, 378, 380, and 382 certainly, it is desirable to energize ink cartridges 300, 302, 304, and 306 so that friction engagement may exist between a finger part and the latch section. An ink cartridge is energized with the energization member or springs 384, 386, 388, and 390 which were attached in either the cartridge body or the ink cartridge. Although an energization member can be made with various ingredients and it is not limited to a coil spring, an elastic form object, a

flat spring, etc., you may have various configurations containing these. It is desirable to turn the energization members 384, 386, 388, and 390 to the cartridge body of the opposite side of the edge of a cartridge or the latch sections 376, 378, 380, and 382, and especially to arrange them. In case a cartridge is inserted into a cartridge body, in order to make a latch member engage with the latch section, a pressure is made to act on each parts 400, 402, 404, and 406 of handles 324, 326, 328, and 330. In order to cancel engagement in a latch member and the latch section, a pressure is made to act on each parts 408, 410, 412, and 414 of handles 324, 326, 328, and 330, and a part for die length effective in releasing the finger parts 332, 334, 336, and 338 of the energization members 384, 386, 388, and 390 from the latch sections 376, 378, 380, and 382 by this is pushed.

[0051] Each energization members 384, 386, 388, and 390 attached in the cylinder projections 387, 389, 391, and 393 at drawing 18 are shown. The cylinder projections 387, 389, 391, and 393 are formed as a part of lower part 395 of the cartridge body 366, or are attached in this lower part 395. The location of the energization members 384, 386, 388, and 390 may arrange an energization member in the top section of the cartridge body 366, the posterior part panel 364, or the correspondence part of the ink cartridge itself rather than is important in this invention.

[0052] The cartridge body 366 is preferably equipped with the parallel reinforcing rib 420, and a reinforcing rib 420 is arranged between the auxiliary member and each cartridge which guide an ink cartridge to a cartridge body. In order to give sufficient width of face to a cartridge body inserting a cartridge in a cartridge body, the crossing reinforcing rib 422 perpendicular to a rib 420 may also be used. Reinforcing ribs 420 and 422 are preferably formed during manufacture of a cartridge body at the reinforcement insertion section 424 inserted into this cartridge body. It is the arrangement guide 426 connected to the ink needle valve assembly 430 of the insertion section 424, and it is desirable especially to form the energization members 384, 386, 388, and 390 in the insertion section 424 like the arrangement guide 426 of the letter of a projection which guides the inlet-port projection of the ink prepared in the ink cartridge. The ink needle valve assembly 430 has the bulb slide member 432 equipped with the bulb, and the slide member guide 434 which guides the slide member 432 possible [sliding] at the time of insertion of a cartridge.

[0053] The ink jet pen concerning this invention has the advantage which can avoid the common problem which encounters in case the exhausted ink cartridge can be exchanged easily and ink cartridges are exchanged. For example, in order to bend the seal member and other configuration members of an ink jet pen or to avoid distorting, the guide rail and slot which were prepared in the ink cartridge and the cartridge body collaborate, and this is guided in order to demount the ink cartridge exhausted from the cartridge body. As well as this in case it attaches a new ink cartridge, a guide rail and a slot collaborate, and this is guided so that an ink cartridge may move linearly substantially in a cartridge body. While acting on a configuration member and deteriorating or damaging this by this, the bending stress which causes the leakage of a liquid or a gas is avoided. Moreover, since poor anchoring of the port to which ink is led from an ink cartridge is avoided, in case an ink cartridge is attached, it can also be prevented that air enters in an ink cartridge, and/or damage on the seal member of a cartridge body can also be prevented.

[0054] In each above-mentioned embodiment, the ink in an ink cartridge is supplied first, and if the ink in an ink cartridge is exhausted and lost, it will be exchanged in an ink cartridge. You may make it supply ink to one or more ink cartridges again with various means as an embodiment replaced with such an embodiment. For example, as shown in drawing 19, in order to re-fill up an ink cartridge with ink, a cap or covering 440 of an ink cartridge 442 is not fixed to side attachment walls 444, 446, 448, and 450 in the periphery section 452 of an ink cartridge 442

top, but it demounts from this periphery section and is good also as possible. It is [that a cap or covering 440 is also equipped with the adapter 454 equipped with one or more holes 456 which engage with one or more posts or projection 458 which projects from the inferior surface of tongue 460 of a cap or covering 440] good in order to make easy removal and anchoring of a cap or covering 440. In this embodiment, an adapter 454 is fixed and attached in the periphery section 452 of an ink cartridge 442 top by welding or adhesion, and a cap or covering 440 is demounted to an adapter 454, and is attached possible. A cap or covering 440 is demounted from an adapter 454, and it can be filled up with ink in an ink cartridge 442 from one or more holes 456 or the ink restoration holes 462.

[0055] furthermore, ink is re-filled up with other embodiments into an ink cartridge 442 continuously or intermittently from an ink reservoir -- as -- covering 440 -- replacing with -- supply -- the covering 464 equipped with the inlet-port port 466 of the ink attached in the conduit 468 may be used (refer to drawing 20). In this embodiment, it may fix to the periphery section 452 of an ink cartridge 442 top directly, and covering 464 may be attached in it without needing an adapter (refer to drawing 19). the ink reservoir in the place distant from the ink cartridge -- the interior of a printer -- you may arrange -- or the inside of an ink container separate from a printer -- arranging -- this ink container and a printer -- the object for ink supply -- you may connect with a conduit. However, it is desirable not to attach such an ink reservoir in the movable base for moving an ink cartridge and a cartridge body during printing actuation.

[0056] It should be understood that various corrections or modification are possible without showing the above-mentioned explanation about the embodiment of this invention only as a purpose of instantiation, and deviating from the intention and range of this invention of a publication to a claim.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the anterior part decomposition perspective view of the ink jet pen in which the suitable embodiment which shows the exchangeable ink cartridge arranged at the cartridge body is shown.

[Drawing 2] It is the decomposition side elevation of the ink jet pen of this invention.

[Drawing 3] It is the posterior part perspective view of the cartridge body of the ink jet pen shown in drawing 1 .

[Drawing 4] It is the expansion side elevation of the latch member in the ink cartridge in the ink jet pen shown in drawing 2 .

[Drawing 5] It is the trailer solution perspective view of the ink jet pen concerning this invention which has many cartridges.

[Drawing 6] It is the anterior part perspective view of the ink jet pen shown in drawing 5 which has the ink cartridge attached in the cartridge body.

[Drawing 7] It is the perspective view of the cartridge body of the ink jet pen shown in drawing 5

[Drawing 8] It is the top view of the cartridge body shown in drawing 5 .

[Drawing 9] It is the flank perspective view of the ink cartridge of the ink jet pen shown in drawing 5 .

[Drawing 10] It is the anterior part decomposition perspective view of the ink jet pen in which other embodiments concerning this invention are shown.

[Drawing 11] It is the trailer solution perspective view of the ink jet pen shown in drawing 10 .

[Drawing 12] It is the anterior part perspective view of the ink jet pen shown in drawing 10 in the condition of having been assembled.

[Drawing 13] It is the posterior part perspective view of the ink jet pen shown in drawing 12 .

[Drawing 14] It is the anterior part perspective view of the ink cartridge of the ink jet pen in which other embodiments concerning this invention are shown.

[Drawing 15] It is the posterior part perspective view of the ink cartridge shown in drawing 14 .

[Drawing 16] It is the trailer solution perspective view of the ink cartridge shown in drawing 14 .

[Drawing 17] It is the anterior part perspective view of an ink jet pen equipped with the ink cartridge shown in drawing 14 .

[Drawing 18] It is the decomposition perspective view which cut the ink jet pen shown in drawing 16 .

[Drawing 19] It is the decomposition perspective view showing the ink re-restoration system of an ink cartridge.

[Drawing 20] It is the perspective view of ink cartridge covering equipped with the adapter for re-filling up a cartridge with ink in this invention.

[Description of Notations]

10,100,200 .. 12 An ink jet pen, 20,208,366 .. Cartridge body, 14, 22, 24, 26, 28, 202, 300, 302,304,306,442 .. Ink cartridge, 16, 30, 32, 34, 36,368,370,372,374 .. Print head, 44, 46, 103, 105, 107, 109, 204, 324,326,328,330 .. Handle, 50,110,112,114,116 .. An exit port, 48, 102, 104, 106, 108,126,128,206 .. Body section, 84, 118, 120, 122, 124, 230, 332,334,336,338 .. Latch member, 92,238 .. The leg, 94 .. The lever section, 96,332,334,336,338 .. Finger part, 180, 186, 188, 214, 358, 360, 362, 377,379,381,383 [.. Port.] .. A slot, 384,386,388,390 .. An energization member, 440,464 .. Covering, 466

[Translation done.]

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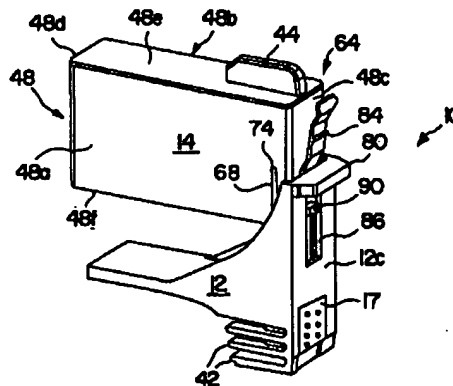
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(54) 【発明の名称】 インクジェットペン、該インクジェットペンに使用する交換可能なインクカートリッジ及び該インクカートリッジの交換方法

(57) 【要約】

【課題】 プリントヘッドを有するカートリッジ本体と、カートリッジ本体に対して取外し可能であって交換可能なインクカートリッジとを備えたインクジェットペンを提供する。

【解決手段】 少なくとも一つの細長い凹部と少なくとも一つの凸部が、カートリッジ本体(12、20、208、366)とインクカートリッジ(14、22、24、26、28、202、300、302、304、306、442)の互いに向き合った面に配置される。カートリッジ本体に対してインクカートリッジを所望の位置にガイドして配置するために、凹部と凸部は互いに係合可能である。



【特許請求の範囲】

【請求項1】 プリントヘッドを有するカートリッジ本体と、交換可能なインクカートリッジとを有し、前記カートリッジ本体と前記インクカートリッジとは、長手方向に平行な軸を有する少なくとも一つの細長い凹部と少なくとも一つの凸部とを互いに向き合う面に備えたインクジェットペンであって、

前記カートリッジ本体に対して所望の位置に前記インクカートリッジが配置されるように前記凹部軸と少なくとも実質的に平行なガイド軸に沿って前記インクカートリッジがガイドされるために、前記少なくとも一つの凹部と前記少なくとも一つの凸部とは相互に係合可能であり、

前記カートリッジ本体に対して所望の位置に前記インクカートリッジを保持するために、該インクカートリッジに接続されたラッチ部材が前記カートリッジ本体の一部分と係合可能である、インクジェットペン。

【請求項2】 前記カートリッジ本体の一部分と係合する前記ラッチ部材を付勢する付勢部材を更に備える、請求項1に記載のインクジェットペン。

【請求項3】 前記少なくとも一つの凹部が細長いスロットからなり、該スロットが前記インクカートリッジの第1の部分から該インクカートリッジの第2の部分に向けて延出し、
前記少なくとも一つの凸部が細長い凸条からなり、該凸条が前記カートリッジ本体の第2の部分から該カートリッジ本体の第1の部分に向けて延出する、請求項1に記載のインクジェットペン。

【請求項4】 前記細長いスロットの幅が、前記インクカートリッジの第1の部分が該インクカートリッジの第2の部分より広くなるように変化し、
前記細長い凸条が、前記カートリッジ本体の第2の部分が該カートリッジ本体の第1の部分より広くなるように変化する、請求項3に記載のインクジェットペン。

【請求項5】 前記少なくとも一つの凹部が細長いスロットからなり、該スロットが前記カートリッジ本体の第2の部分から該カートリッジ本体の第1の部分に向けて延出し、
前記少なくとも一つの凸部が細長い凸条からなり、該凸条が前記インクカートリッジの第1の部分から該インクカートリッジの第2の部分に向けて延出する、請求項1に記載のインクジェットペン。

【請求項6】 前記細長いスロットの幅が、前記カートリッジ本体の第2の部分が該カートリッジ本体の第1の部分より広くなるように変化し、
前記細長い凸条が、前記インクカートリッジの第1の部分が該インクカートリッジの第2の部分より広くなるように変化する、請求項5に記載のインクジェットペン。

【請求項7】 少なくとも2つの凹部と少なくとも2つの凸部とが、前記インクカートリッジと前記カートリッ

ジ本体の互いに向き合う面に配置された、請求項1に記載のインクジェットペン。

【請求項8】 前記インクカートリッジがインクを再充填するための取外し可能なカバーを備えた、請求項1に記載のインクジェットペン。

【請求項9】 前記インクカートリッジがインクを再充填するためのポートを有するカバーを備えた、請求項1に記載のインクジェットペン。

【請求項10】 プリントヘッドを有するカートリッジ本体と、交換可能なインクカートリッジとを提供する段階と、

前記インクカートリッジ内のインクが前記プリントヘッドと連通するように前記インクカートリッジを前記カートリッジ本体に収容するために、前記カートリッジ本体に対して前記インクカートリッジを移動させる段階と、
前記カートリッジ本体に対して所望の位置に前記インクカートリッジを保持するために、前記カートリッジ本体の一部分と前記インクカートリッジに接続されたラッチ部材とを係合させる段階とからなる、インクジェットペンのインクカートリッジを交換する方法であって、
前記カートリッジ本体と前記インクカートリッジとは、長手方向に平行な軸を有する少なくとも一つの細長い凹部と、該凹部と係合可能な少なくとも一つの凸部とを備え、前記凹部と凸部とを係合させつつ前記インクカートリッジを移動させる方向が、前記凹部軸に対して少なくとも実質的に平行な方向である、インクカートリッジの交換方法。

【請求項11】 前記カートリッジ本体が、該本体の一部分と係合する前記ラッチ部材を付勢する付勢部材を更に備える、請求項10に記載のインクカートリッジの交換方法。

【請求項12】 前記少なくとも一つの凹部が細長いスロットからなり、該スロットが前記インクカートリッジの第1の部分から該インクカートリッジの第2の部分に向けて延出し、
前記少なくとも一つの凸部が細長い凸条からなり、該凸条が前記カートリッジ本体の第2の部分から該カートリッジ本体の第1の部分に向けて延出する、請求項10に記載のインクカートリッジの交換方法。

【請求項13】 前記細長いスロットの幅が、前記インクカートリッジの第1の部分が該インクカートリッジの第2の部分より広くなるように変化し、
前記細長い凸条が、前記カートリッジ本体の第2の部分が該カートリッジ本体の第1の部分より広くなるように変化する、請求項12に記載のインクカートリッジの交換方法。

【請求項14】 前記少なくとも一つの凹部が細長いスロットからなり、該スロットが前記カートリッジ本体の第2の部分から該カートリッジ本体の第1の部分に向けて延出し、

前記少なくとも一つの凸部が細長い凸条からなり、該凸条が前記インクカートリッジの第1の部分から該インクカートリッジの第2の部分に向けて延出する、請求項10に記載のインクカートリッジの交換方法。

【請求項15】 前記細長いスロットの幅が、前記カートリッジ本体の第2の部分が該カートリッジ本体の第1の部分より広くなるように変化し、

前記細長い凸条が、前記インクカートリッジの第1の部分が該インクカートリッジの第2の部分より広くなるように変化する、請求項14に記載のインクカートリッジの交換方法。

【請求項16】 前記インクカートリッジが取外し可能なカバーを備え、前記インクカートリッジから前記カバーを取外して前記インクカートリッジ内にインクを再充填する段階を更に備える、請求項10に記載のインクカートリッジの交換方法。

【請求項17】 前記インクカートリッジがインク充填用ポートを有するカバーを備え、前記インク充填用ポートから前記インクカートリッジ内にインクを供給することによって、前記インクカートリッジ内にインクを再充填する段階を更に備える、請求項10に記載のインクカートリッジの交換方法。

【請求項18】 プリントヘッドを備える半永久的又は永久的なカートリッジ本体を有するタイプのインクジェットペンに使用され、前記カートリッジ本体に取付けられる交換可能なインクカートリッジであって、リザーバを画成し、かつ当初に供給されたインクを前記リザーバ内に含有する本体部と、前記本体部の上部に画成されたハンドルと、前記本体部の側部に画成され前記カートリッジ本体のラッチ部と係合するラッチ機構と、前記本体部に画成され前記リザーバと連通する出口ポートであって、当該インクカートリッジが前記カートリッジ本体に取付けられる際に前記プリントヘッドと連通するように配置された出口ポートと、当該インクカートリッジの実質的に垂直な長手軸に沿って実質的に整列し、かつ当該インクカートリッジの一つ以上の外面に画成された細長い構造体を備え、当該インクカートリッジが前記カートリッジ本体に取付けられる際に、前記構造体が、前記カートリッジ本体の一つ以上の細長い部位であって長手方向に平行な軸を有する細長い部位と係合可能のように配置され、当該インクカートリッジが移動する少なくとも当初に前記細長い部位の軸と実質的に平行な方向において、当該インクカートリッジが前記カートリッジ本体に対して所望の位置にガイド可能に配置される、交換可能なインクカートリッジ。

【請求項19】 前記細長い構造体が、前記本体部の両側に少なくとも2つの細長い凹部を備えた、請求項18に記載のインクカートリッジ。

【請求項20】 前記細長い構造体が、前記本体部の両側に少なくとも2つの細長い凸部を備えた、請求項18に記載のインクカートリッジ。

【請求項21】 前記ラッチ機構が、脚部と、該脚部から上方に延出し、かつ外方に付勢されたレバー部と、該レバー部に配置され、かつ外方に延出する指部であって前記カートリッジ本体のラッチ部と係合する指部とを備えた、請求項18に記載のインクカートリッジ。

【請求項22】 前記ラッチ機構が、外方に延出する実質的に堅固な指部であって前記カートリッジ本体のラッチ部と係合する指部を備え、当該インクカートリッジの前記ハンドルとは反対側の下方部であって、前記カートリッジ本体と当該インクカートリッジとの間に付勢部材が設けられた、請求項18に記載のインクカートリッジ。

【請求項23】 前記付勢部材がコイルバネからなる、請求項22に記載のインクカートリッジ。

【請求項24】 インクを再充填するために取外し可能なカバーを備えた、請求項18に記載のインクカートリッジ。

【請求項25】 インクを再充填するためのインク充填用ポートを有するカバーを備えた、請求項18に記載のインクカートリッジ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明はインクジェットプリンタに関し、特に、インクジェットペン及びその構成部材に関する。

【0002】

【従来の技術】サーマルインクジェットプリンタは、交換可能なインクカートリッジを有する永久的又は半永久的なインクジェットペンを組込むようになりつつある。インクジェットペンは、交換可能なインクカートリッジと、永久的又は半永久的な構成部材であって、一般的にはTAB回路とプリントヘッドを有するカートリッジ本体とを有する点において特徴付けられる。インクカートリッジの下方端には、通常、インクカートリッジからプリントヘッドへとインクを導くと共にこれを濾過するインクフィルタが設けられる。インクカートリッジ内のインクが消耗すると、消耗したインクカートリッジを新しいインクカートリッジと交換することによりインクジェットペンの寿命が延びる。

【0003】

【発明が解決しようとする課題】新しいインクカートリッジをカートリッジ本体内に適切に収容するように、インクジェットペン进行操作することは重要である。適切に操作されない場合には、インク漏れ、インクカートリッジ内への空気の入り込み、及びインクカートリッジの交換に伴う他の問題が生じる。

【0004】したがって、この分野においては、インク

ジェットペンと共に用いられる、インクジェットペンの改善された構成部材が望まれている。

【0005】本発明の他の目的は、交換可能なインクカートリッジを備えたタイプの改善されたインクジェットペンを提供することである。

【0006】本発明の更なる目的は、改善されたインクカートリッジを提供することである。

【0007】本発明の別の目的は、インクカートリッジを容易に交換し、かつ改善された信頼性と性能とを有するインクジェットペンの提供を可能にする上記特性を備えたデバイスを提供することである。

【0008】本発明の更に別の目的は、単純な形状と使い勝手の良い上記特性を備えたデバイスを提供することである。

【0009】本発明の他の目的は、インクジェットペンの寿命を延ばすための方法を提供することである。

【0010】本発明の更に他の目的は、インクジェットペンのインクカートリッジを交換する方法を提供することである。

【課題を解決するための手段】

【0011】上述の及び他の目的と利点において、本発明は改良されたインクジェットペンに関する。

【0012】本発明の好適な実施態様では、インクジェットペンは、プリントヘッドを有するカートリッジ本体と、カートリッジ本体に移動可能に配置される交換可能なインクカートリッジとを備える。インクカートリッジとカートリッジ本体に、協働して作用する細長い凹部と凸部が設けられる。カートリッジ本体の所望の位置にインクカートリッジをガイド可能に配置するために、凹部と凸部とが係合可能である。

【0013】本発明はまた、インクジェットペンのインクカートリッジを交換する方法に関する。

【0014】好適な実施態様では、本発明に係る方法は、プリントヘッドを有するカートリッジ本体と、交換可能なインクカートリッジとを提供する段階を備える。カートリッジ本体とインクカートリッジとは、協働して互いに係合可能な凹部と凸部とを有する。カートリッジ本体とインクカートリッジは、その凹部と凸部が係合してカートリッジ本体にインクカートリッジが収容されるように相対移動可能であり、その結果、インクカートリッジ内のインクがプリントヘッドと連通する。

【0015】本発明は更に、プリントヘッドを備えた半永久的又は永久的なカートリッジ本体を有するタイプのインクジェットペンに使用されるインクカートリッジであって、上記カートリッジ本体に交換可能に取付けられるインクカートリッジに関する。

【0016】好適な実施態様では、交換可能なインクカートリッジは、リザーバを画成し、かつ該リザーバ内にインクを含有する本体部と、該本体部に画成され、かつリザーバと連通する出口ポートと、インクカートリッジ

の実質的に垂直な長手軸に沿って実質的に整列し、かつインクカートリッジの一つ以上の外面に画成された構造体とを備える。上記出口ポートは、インクカートリッジがカートリッジ本体に取付けられる際にプリントヘッドと連通するように配置される。インクカートリッジの上記構造体は、インクカートリッジがカートリッジ本体に取付けられる際にカートリッジ本体の一つ以上の部位と係合可能のように配置される。このような係合によって、インクカートリッジがカートリッジ本体に取付けられる際に、インクカートリッジがカートリッジ本体に対して所望の位置にガイド可能に配置される。

【0017】本発明は、インクジェットペンのインクカートリッジを容易に交換できる利点を有する。

【0018】添付の図面と共に詳細な説明を参照することによって、本発明の更なる利点が明らかになるであろう。添付図面は一定の尺度で描かれておらず、また、複数の図面において同様の要素には同様の記号が付されている。

【0019】

【発明の実施の形態】本発明は、使い捨ての構成要素、ならびに、永久的又は半永久的な構成要素を有するタイプのインクジェットペンに関する。インクジェットペンの構成要素は、使い捨ての構成要素を容易に交換するのに有利な形状を成す。図1～図4には、インクジェットペン10と、永久的又は半永久的なカートリッジ本体12を含む構成要素が示される。カートリッジ本体12は、回路17のようなTAB回路に接続されたインクジェットプリントヘッド16にインクを供給する交換可能なインクカートリッジ14に取付け可能である。

【0020】カートリッジ本体12は、単一のインクカートリッジを保持する形状としてもよく、あるいは、多数のインクカートリッジであって好ましくは異なる色インクのインクカートリッジを保持する形状としてもよい。単一のインクカートリッジ14の場合には、カートリッジ本体12は、インクカートリッジ14の反対側に位置する最下面18に近接する単一のプリントヘッド16を好ましくは備える。

【0021】図5～図9に示すように、同色の多数カートリッジ又は多色カートリッジの場合には、多数のインクカートリッジ22、24、26、28、ならびに、TAB回路又はフレキシブル回路37、38、39、40に接続された多数のプリントヘッド30、32、34、36を備える一つ以上のカートリッジ本体20を設けてもよい。

【0022】図10～図13の実施態様は、複数の別個のインクチャンバを有する単一のインクカートリッジを示す。インクチャンバの数は3個又は4個が好ましく、各インクチャンバは異なる色のインクを備え、カートリッジ本体は各インク色に対して一つのプリントヘッドを有する。

【0023】高速で高品質の印刷操作では、カートリッジ本体に取付けられたプリントヘッドから熱が除去されるのが好ましい。これは、アルミニウム、ステンレスチール、亜鉛、他の金属及び合金のような熱伝導性の金属によってカートリッジ本体を構成することによって、及び／又は、熱伝導性のフィン42をカートリッジ本体12に設けるか、伝導及び対流によってプリントヘッドから熱を除去するためのフィン42'をカートリッジ本体20に設ける（図7参照）ことによって達成してもよい。インクカートリッジ14は、通常、ポリエチレン又はポリプロピレンのような熱可塑性のポリマー材料から作られ、このようなポリマー材料はインクに対して耐腐食性を有する。

【0024】図1～図4に示すように、交換可能なインクカートリッジ14は、ハンドル44（又は46）が設けられた上部、ならびに、側面48a、48b、前面48c、後面48d、上面48e、底面48fを有する本体部48を備える。ハンドル44（又は46）は上面48eに位置する。

【0025】出口導管又はポート50が本体部48の底面48fに設けられ、本体部48の内部と連通する。プリントヘッドにインクを供給するために、ポート50はニードルバルブによってプリントヘッド16と連通するように配置される。好ましくは、出口ポート50には、インクカートリッジ14からプリントヘッド16に移送されるインクを濾過するためのフォームのようなフィルタ材料が備えられ又は設けられる。

【0026】出口ポート50は、破壊可能な膜又は前もって孔の開けられたエラストマーセパタムによって、当初においてシールされていてよい。プリントヘッド16と連通するようにインクカートリッジ14をカートリッジ本体12内に載置して取付ける際に、インクニードルによって上記膜が破られる。下記において詳細に説明するニードルバルブアセンブリを、カートリッジ本体12の凹部54に収容、載置してもよい。ニードルバルブアセンブリがカートリッジ本体に取付けられる際に、凹部54に配置したOリング56のようなシールによってインク漏れが防止される（図3参照）。

【0027】カートリッジ本体12とインクカートリッジ14は、消耗したインクカートリッジを新しいインクカートリッジと交換し易いように、相互に係合可能な凸部と凹部を備える。この点に関し、カートリッジ本体12は、好ましくは、カートリッジ本体12の両面12a、12bの対向する内面64及び66に設けられた一対のガイドレール58及び60のような凸部（凸条）を備える（図3参照）。ガイドレール58及び60は、インクカートリッジ14の両側48a、48bの各外面に設けられたガイド溝又はスロット68のような対応する凹部に収容される（図2参照）。インクカートリッジ14がカートリッジ本体12に挿入される際に、カートリ

ッジ本体12に対してインクカートリッジ14が挿入可能な方向を向くように、ガイドレール58、60及びスロット68は、インクカートリッジ14が実質的に垂直又は直線的に移動するのを協働してガイドし、これにより、インクカートリッジ14がカートリッジ本体12に正しく取付けられる。

【0028】カートリッジ14が実質的に垂直又は直線的に移動することにより、インクカートリッジの本体12aへの取付けとポート50の凹部54への結合が容易になり、その結果、インクカートリッジ14と本体12aとの間に実質的に気液の堅固な結合が形成される。本発明を限定する意図でなく説明の目的において、カートリッジ14又は本体12について用いる用語「垂直な」とは、カートリッジ14が本体12内に挿入される際に、ガイドレール58、60及び／又はスロット68によって画成される軸に実質的に沿った方向におけるカートリッジ14の当初の移動を示すものであり、カートリッジ14の絶対的な方向又は向きを示すものではない。さらに、用語「実質的に垂直な」は、ガイドレール58、60及びスロット68に沿った垂直軸に対してカートリッジ14を10度以下に傾けることによって、インクカートリッジ14がカートリッジ本体12に取付けられることを意味する。通常、カートリッジ14は垂直軸から約2度以下の角度で傾けられる。

【0029】インクカートリッジ14に直接凹部を形成してスロット68を設けてもよく、又は、側面48a、48bに設けた突出部70の上にスロット68を配置してもよい。スロット68をカートリッジ本体12に配置し、ガイドレール58及び60をインクカートリッジ14に配置してもよい。また、単一のガイドレール58又は60をカートリッジ本体12の一方の側部に配置すると共にスロット68をカートリッジ本体12の他方の側部に配置し、カートリッジ本体12の単一ガイドレールに係合するスロットと、カートリッジ本体12のスロットに係合する単一ガイドレールとを、インクカートリッジ14の対応する側面に設けてもよい。

【0030】スロット68は好ましくは先細りしており、約5～約8ミリメートルの幅を有する幅の広い第1端部72と、約3～約5ミリメートルの幅を有する幅の狭い第2端部74を備える。各スロット68の全長は、好ましくは約30～約60ミリメートルである。ガイドレール58及び60は、スロット68内にぴったり適合し、かつ滑動可能に収容されるような形状を成す。各ガイドレール58及び60は、好ましくは、幅が狭く先細りした第1端部76と、幅の広い第2端部78を備える。スロット68の第1端部72は幅広となっているので、ガイドレールの幅の狭い第1端部76は当初その中に容易に収容される。他の固定具を用いることなくカートリッジ本体12に対してインクカートリッジ14を好適な位置に配置するようして、ガイドレール58及び

60全体がスロット68内に収容されると、ガイドレールとスロットは協働してぴったりとした係合を形成する。しかしながら、所望であれば、他の固定具を用いてもよい。

【0031】この関係において、カートリッジ本体12の両側部12a及び12bに接続される前面12cは、インクカートリッジ14のラッチ部材84と係合するための外側に垂直に延出する突出部80を備えていてもよい。インクカートリッジ14の前面48cから延出するメモリ支持アーム88と、接着剤によってメモリ支持アーム88に取付けられるメモリデバイス90とを配置するための空間を設けるために、細長いスロット又は切欠き86を好ましくは前面12c中央部に設けてもよい。上記メモリデバイス90は、配列情報、インク情報及びプリンタ制御システムに関する情報を受信、記憶及び／又は伝達する。

【0032】図4に最も良く示されるように、ラッチ部材84は、好ましくは、前面48cに取付けられると共に該前面から外方に延出する下方の脚部92を備える。上方のレバー部94は、脚部92の最上部からハンドル44又は46にはほぼ向かった方向において上方に延出する。ラッチ部材84の前側に位置して外方に延出する指部96が、脚部92とレバー部94の接続部分に近接して設けられている。インクカートリッジ14をカートリッジ本体12に取外し可能なように、突出部80の下面80cと指部96が係合可能となっている。脚部92とレバー部94の間に、補強のための補強部材98を延出させるのが好ましい。ハンドル44又は46に向う方向にレバー部94を加圧することにより、脚部92は前面48cに向けて付勢される。このようにして、カートリッジ本体12にインクカートリッジ14をさらに確実に収容するために、ラッチ部材84が突出部80の下面80cと係合可能なように配置される。

【0033】本発明によって達成される利点は、1回の操作によって、カートリッジ本体12にインクカートリッジ14を取付け可能であり、かつ、カートリッジ本体12からインクカートリッジ14を取外し可能なことである。ハンドル44又は46の形状により上記特徴が与えられるものである。好適な実施態様では、ハンドル44又は46は、織面又はギザギザ99bとハンドル46の厚さ方向に貫通する孔99cとを有する湾曲した後面99aを備える。インクカートリッジの取付け及び取外しの最中にインクカートリッジ14を確実に保持するために、使用者は、指のような付属物を孔99cに挿入してもよく、また、後面99aのギザギザ99bに親指又は他の指のような他の付属物を添えてもよい。

【0034】図5～図9には、本発明に係るインクジェットペン100の他の実施態様であって、多数のインクカートリッジ及び多数のカートリッジ本体とを有するインクジェットペン100が示される。各カートリッジ本

体は、少なくとも一つのプリントヘッドを備える。上述のように、インクジェットペン100は、カートリッジ本体20、インクカートリッジ22、24、26及び28、ならびに、TAB回路又はフレキシブル回路37、38、39及び40に接続されたプリントヘッド30、32、34及び36を備える。

【0035】各インクカートリッジ22、24、26及び28は、インクカートリッジ14の形状と実質的に同様であるのが好ましい。したがって、カートリッジ22は、ハンドル103、出口ポート110及びラッチ部材118を有する本体部102を備える。インクカートリッジ24、26及び28も同様な形状であり、ハンドル105、107及び109、出口ポート112、114及び116、ならびに、ラッチ部材120、122及び124をそれぞれ有する本体部104、106及び108を備える。Oリング56のようなシールによってポート50を凹部54内に収容するように、ポート110～116をカートリッジ本体20の凹部54'内に収容してもよい(図3参照)。

【0036】さらに図7及び図8に示すように、カートリッジ本体20は、インクカートリッジ22を収容する形状を成す本体部126と、インクカートリッジ24、26、及び28を収容する形状を成す本体部128とを備える。本体部126及び128は分離していてもよいが、フィン42'によって互いに強固に接続されているのが好ましい。

【0037】本体部126は、内面134及び136とそれぞれ互いに向き合う側壁130及び132を備え、これら側壁間にインクカートリッジ22が配置される。ガイドレール138及び140(ガイドレール58及び60と同様の形状を成す)が、対応するスロット142(スロット68と同様の形状を成す)と係合するために、カートリッジ本体の対向する各側の面134及び136にそれぞれ形成される。

【0038】同様に、本体部128は側壁144、146、148及び150を備える。インクカートリッジ24は、側壁144の面152と側壁146の面154の間に配置される。インクカートリッジ26は、側壁146の面156と側壁148の面158の間に配置される。インクカートリッジ28は、側壁148の面160と側壁150の面162の間に配置される。ガイドレール164及び166(ガイドレール58及び60と同様の形状を成す)が、対応するスロット168(スロット68と同様の形状を成す)と係合するために、カートリッジ本体24の対向する各側の面152及び154にそれぞれ形成される(図9参照)。同様の形状を成すガイドレール170及び172が、対応するスロット174と係合するために、カートリッジ本体26の両側の各面156及び158にそれぞれ形成される。ガイドレール176及び178が、対応するスロット180と係合す

るために、カートリッジ本体28の対向する両側の各面160及び162にそれぞれ形成される

【0039】図9に示すように、スロット168、174及び180は、互い違いに又は並列に配置されるのが好ましい。対応するガイドレールのセット164と166、170と172、176と178も同様に、互い違いに又は並列に配置され、各ガイドレールセットはこれらに平行な単一平面上に位置しないように配置される。このことは、対応するプリントヘッドに対して望ましくない誤った位置にインクカートリッジを配置することを好都合に防止する。例えば、インクカートリッジ24、26及び28は、好ましくは異なる色のインクを備える。プリントヘッドに対してインクカートリッジを誤った位置に配置することにより、プリントヘッドを通して誤った色のインクが分配されることになる。インクカートリッジのスロットと正しい対応関係にあるガイドレールを有するカートリッジ本体の空間に当該インクカートリッジが収容されるように、スロット及びガイドレールを設けることによって、インクカートリッジを誤った位置に配置することが防止される。

【0040】本体部126は突出部182を有し、本体部128は突出部184を有する(図7参照)。突出部182及び184は、好ましくは、インクカートリッジ22、24、26及び28のラッチ部材118、120、122及び124と係合する突出部80と同様の形状を成す。各ラッチ部材118～124は、ラッチ部材84と同様の形状としてもよい。メモリー支持アーム88及びメモリーデバイス90について既に説明したように、メモリー支持アーム88'(図6参照)及びこれに取付けられるメモリーデバイスを交換するための空間を提供するために、細長いスロット又は切欠き186及び188が、本体部126及び128の前面の中央部に設けられている。

【0041】図10～図13は、本発明に係る更に他の実施態様のインクジェットペン200を示す。インクジェットペン200は、ハンドル204と本体部206とを有する交換可能なインクカートリッジ202を備える。インクカートリッジ202は、数個のインクチャンバを内部に有するのが好ましく、各インクチャンバは異なる色のインクを備える。好ましくは、インクカートリッジ202は3又は4個のインクチャンバを備える。

【0042】インクカートリッジ202の本体部206は、カートリッジ本体208内に収容される。カートリッジ本体は、フィン42'と複数のプリントヘッドとを有する。210で示されるプリントヘッドは、TAB回路又はフレキシブル回路212に接続される。プリントヘッドの数は、インクチャンバの数、すなわちインク色の数に相当し、各インク色に対して一つのプリントヘッドが設けられる。各プリントヘッドと連通する各インクチャンバを配置する上で、適当な出口ポート又はフィル

タが同様に設けられる。

【0043】スロット68に相当するスロット214が、側壁220及び222の対向する内面216及び218に設けられる。スロット214は、ガイドレール58及び60に相当するガイドレール224を収容し、本体部206の両側226及び228に配置される。

【0044】ラッチ部材230は、孔232と係合するために本体部206の上部に配置されるのが好ましい。孔232は、カートリッジ本体208の前側壁236の最上部から上方に突出する突出部234を貫通して設けられる。ラッチ部材230は、インクカートリッジの上面240から上方に延出する付勢される脚部238を備える。脚部238の最上端に位置するレッジ242は、孔232と係合可能な形状を成す。脚部238のレッジ242に近接した部分から上方に延出する接触面244に使用者が力を作用させることにより、孔232からレッジ242が抜き取られる。

【0045】図14～図18は、本発明に係る更に他の実施態様のインクジェットペンを示す。図14及び図15に示すように、インクカートリッジ300、302、304及び306は、前部パネル308、310、312及び314、ならびに、上部パネル316、318、320及び322を備える本体部を有し、各上部パネルはハンドル324、326、328及び330をそれぞれ備える。下記において更に詳細に説明するが、各前部パネル308、310、312及び314は、メモリーモジュール317、319、321及び323が取付けられる一対のメモリー支持アーム309、311、313及び315を備え、かつ、ラッチ部をカートリッジ本体に係合させるためのラッチ部材又は指部材332、334、336及び338を備える。

【0046】カートリッジをインクジェットペンに正しく配置するために、インクカートリッジ300、302及び304の本体部の後部パネル340、342及び344には、カートリッジの色インクに連結されたキー346、348及び350が設けられている。インクカートリッジ306は、シアン、マゼンタ及びイエローの各インクカートリッジよりも大きなリザーバを有するブラックインクのカートリッジであるのが好ましい。したがって、カートリッジ306はインクジェットペン内の一つの位置にのみ収まるようになっているので、カートリッジ306の収容される特定位置を記号で示しておく必要がない。しかしながら、所望であれば、インクカートリッジ306が収容される特定位置をインクジェットペン内に記号で示してもよい。

【0047】キー346、348及び350は、一つ以上の細長く、実質的に堅固な突起352、354及び356を備えるのが好ましい。このような突起は、パネル340、342及び344から外側にそれぞれ突出する。突起352、354及び356の水平位置、垂直位

置及び／又は幅は、カートリッジ本体366の後部パネル364に設けられた細長いスロット358、360及び362に適合するように変化させてもよい。カートリッジ本体366内にカートリッジが正しく配置されかつ挿入される際に、突起352、354及び356がスロットと確実に係合するように、スロット358、360及び362の長さ、幅及び／又は位置は、各色のカートリッジによって変化させるのが好ましい。

【0048】インクカートリッジ300、302、304及び／又は306をカートリッジ本体366内に挿入して取付ける際に、挿入当初においては、インクカートリッジ300、302、304及び／又は306は、カートリッジ本体に対して約10度より大きな角度をもって傾けられ、上記で定義したような実質的に垂直又は直線的な方向においてカートリッジ本体366内に挿入される。したがって、カートリッジがカートリッジ本体内に挿入される当初は、突起352、354及び356もまた、カートリッジ本体366に設けられた細長いスロット358、360及び362内で直線的にガイドされる。

【0049】図17及び図18に基づいて、インクカートリッジ300、302、304及び306をカートリッジ本体366に確実に収容し、プリントヘッド368、370、372及び374にインクを供給するためのラッチ機構を説明する。上述のように、カートリッジ300、302、304及び306の各前部パネル308、310、312及び314は、ラッチ部材又は指部材332、334、336及び338をそれぞれ備える。これらラッチ部材又は指部材は、本体部366の対応するラッチ部376、378、380及び382と係合する。前部パネルはまた、メモリーモジュール317、319、321及び323をそれぞれ保持するメモリー支持アーム309、311、313及び315を備える(図14参照)。カートリッジ300、302、304及び306がカートリッジ本体366に対して垂直に配置されてその内部に挿入される際に、メモリーモジュール、支持アーム及び指部は、カートリッジ本体366の前部パネルのスロット377、379、381及び383内に滑入し、メモリーモジュールがプリンタに電気的に接続される。カートリッジ本体366のラッチ部376、378、380及び382は、カートリッジのラッチ部材332、334、336及び338とそれぞれ係合するために棚状又は肩状としてよい。ラッチ部材は実質的に堅固な指状であることが好ましいが、弾性的に付勢される指部を用いてもよい。メモリーモジュールを保持する支持アームの更なる利点は、指部とラッチ部が係合する際に、カートリッジ本体366においてカートリッジ300、302、304及び306が容易にガイドされることである。

【0050】指部332、334、336及び338を

ラッチ部376、378、380及び382に確実に係合させるためには、指部とラッチ部との間に摩擦係合が存在するように、インクカートリッジ300、302、304及び306を付勢するのが好ましい。カートリッジ本体又はインクカートリッジのいずれかに取付けられた付勢部材又はバネ384、386、388及び390によって、インクカートリッジは付勢される。付勢部材は様々な材料によって作ることができ、かつ、コイルバネ、弾性フォーム体、板バネ等に限定されるものではないがこれらを含む様々な形状を有していてもよい。付勢部材384、386、388及び390を、カートリッジの端部又はラッチ部376、378、380及び382の反対側のカートリッジ本体に向けて配置するのが特に好ましい。カートリッジがカートリッジ本体内に挿入される際に、ラッチ部材をラッチ部に係合させるために、ハンドル324、326、328及び330の各部分400、402、404及び406に圧力を作用させる。ラッチ部材とラッチ部との係合を解除するために、ハンドル324、326、328及び330の各部分408、410、412及び414に圧力を作用させ、これによって、付勢部材384、386、388及び390の、指部332、334、336及び338をラッチ部376、378、380及び382から解放するのに有効な長さ分が押される。

【0051】図18に、円筒突起387、389、391及び393に取付けられた各付勢部材384、386、388及び390を示す。円筒突起387、389、391及び393は、カートリッジ本体366の下部395の一部として形成され、又は該下部395に取付けられる。付勢部材384、386、388及び390の位置は本発明において重要ではなく、カートリッジ本体366の上側部又は後部パネル364、あるいは、インクカートリッジ自体の対応箇所に付勢部材を配置してもよい。

【0052】カートリッジ本体366は、好ましくは、平行な補強リブ420を備え、補強リブ420は、カートリッジ本体にインクカートリッジをガイドする補助部材と各カートリッジとの間に配置される。カートリッジをカートリッジ本体に挿入するのにカートリッジ本体に十分な幅を持たせるために、リブ420に垂直な横断補強リブ422も用いてもよい。補強リブ420及び422は、好ましくは、カートリッジ本体の製造中に該カートリッジ本体内に挿入される補強挿入部424に設けられる。挿入部424のインクニードルバルブアセンブリ430に接続される配置ガイド426であって、インクカートリッジに設けられたインクの入口突起をガイドする突起状の配置ガイド426と同様に、付勢部材384、386、388及び390を挿入部424に設けるのが特に好ましい。インクニードルバルブアセンブリ430は、バルブを備えたバルブスライド部材432と、

カートリッジの挿入時においてスライド部材432を滑動可能にガイドするスライド部材ガイド434とを有する。

【0053】本発明に係るインクジェットペンは、消耗したインクカートリッジを容易に交換でき、かつ、インクカートリッジを交換する際に遭遇する共通の問題を回避できる利点を有する。例えば、インクジェットペンのシール部材及び他の構成部材を曲げたり歪めることを回避するために、インクカートリッジとカートリッジ本体に設けられたガイドレール及びスロットが協働して、カートリッジ本体から消耗したインクカートリッジを取外すべくこれをガイドする。これと同様に、新しいインクカートリッジを取付ける際にも、ガイドレールとスロットが協働して、カートリッジ本体においてインクカートリッジが実質的に直線的に移動するようにこれをガイドする。これにより、構成部材に作用してこれを劣化又は損傷させると共に液体又は気体の漏れを引き起す曲げ応力等が回避される。また、インクカートリッジからインクを導くポートの取付け不良が回避されるので、インクカートリッジを取付ける際にインクカートリッジ内に空気が入るのも防止でき、及び／又は、カートリッジ本体のシール部材の損傷も防止できる。

【0054】上述の各実施態様においては、まずインクカートリッジ内のインクが供給され、インクカートリッジ内のインクが消耗して無くなるとインクカートリッジが交換されるようになっている。このような実施態様に代わる実施態様として、様々な手段により、一つ以上のインクカートリッジにインクを再度供給するようにしてもよい。例えば、図19に示すように、インクカートリッジにインクを再充填するために、インクカートリッジ442のキャップ又はカバー440を、インクカートリッジ442の上側の周縁部452において側壁444、446、448及び450に固定するのではなく、この周縁部から取外し可能としてもよい。キャップ又はカバー440の取外し及び取付けを容易にするために、キャップ又はカバー440の下面460から突出する一つ以上のポスト又は突起458と係合する一つ以上の孔456を備えたアダプタ454を、キャップ又はカバー440が備えるようにしもよい。この実施態様では、アダプタ454はインクカートリッジ442の上側の周縁部452に溶接又は接着によって固定して取り付けられ、キャップ又はカバー440はアダプタ454に取外し可能に取付けられる。キャップ又はカバー440をアダプタ454から取外し、一つ以上の孔456又はインク充填孔462からインクカートリッジ442内にインクを充填できる。

【0055】更に他の実施態様では、インクリザーバからインクを連続的又は間欠的にインクカートリッジ442に再充填するように、カバー440に代えて、供給導管468に取付けられたインクの入口ポート466を備

えたカバー464を用いてもよい(図20参照)。この実施態様では、カバー464はアダプタを必要としないで、インクカートリッジ442の上側の周縁部452に直接、固定して取り付けてもよい(図19参照)。インクカートリッジから離れたところにあるインクリザーバはプリンタ内部に配置してもよく、又は、プリンタとは別個のインク容器内に配置し該インク容器とプリンタとをインク供給用導管によって接続してもよい。しかしながら、印刷操作中にインクカートリッジとカートリッジ本体とを移動させるための可動台に、このようなインクリザーバを取付けられないのが好ましい。

【0056】本発明の実施態様についての上記説明は例示の目的としてのみ示され、特許請求の範囲に記載の本発明の意図及び範囲から逸脱することなく、様々な修正または変更が可能であることが理解されるべきである。

【図面の簡単な説明】

【図1】カートリッジ本体に配置された交換可能なインクカートリッジを示す好適な実施態様を示すインクジェットペンの前部分解斜視図である。

【図2】本発明のインクジェットペンの分解側面図である。

【図3】図1に示すインクジェットペンのカートリッジ本体の後部斜視図である。

【図4】図2に示すインクジェットペンにおけるインクカートリッジにおけるラッチ部材の拡大側面図である。

【図5】多数のカートリッジを有する本発明に係るインクジェットペンの後部分解斜視図である。

【図6】カートリッジ本体に取付けられたインクカートリッジを有する図5に示すインクジェットペンの前部斜視図である。

【図7】図5に示すインクジェットペンのカートリッジ本体の斜視図である。

【図8】図5に示すカートリッジ本体の平面図である。

【図9】図5に示すインクジェットペンのインクカートリッジの側部斜視図である。

【図10】本発明に係る他の実施態様を示すインクジェットペンの前部分解斜視図である。

【図11】図10に示すインクジェットペンの後部分解斜視図である。

【図12】組立てられた状態にある、図10に示すインクジェットペンの前部斜視図である。

【図13】図12に示すインクジェットペンの後部斜視図である。

【図14】本発明に係る他の実施態様を示すインクジェットペンのインクカートリッジの前部斜視図である。

【図15】図14に示すインクカートリッジの後部斜視図である。

【図16】図14に示すインクカートリッジの後部分解斜視図である。

【図17】図14に示すインクカートリッジを備えるイ

ンクジェットペンの前部斜視図である。

【図18】図16に示すインクジェットペンを切断した分解斜視図である。

【図19】インクカートリッジのインク再充填システムを示す分解斜視図である。

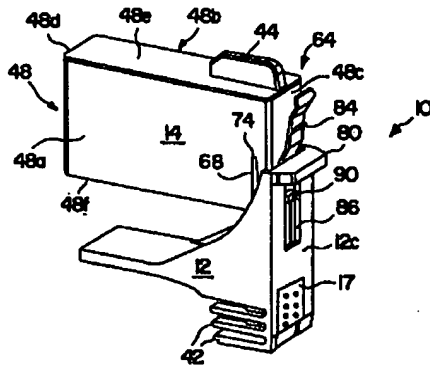
【図20】本発明における、カートリッジにインクを再充填するためのアダプタを備えたインクカートリッジカバーの斜視図である。

【符号の説明】

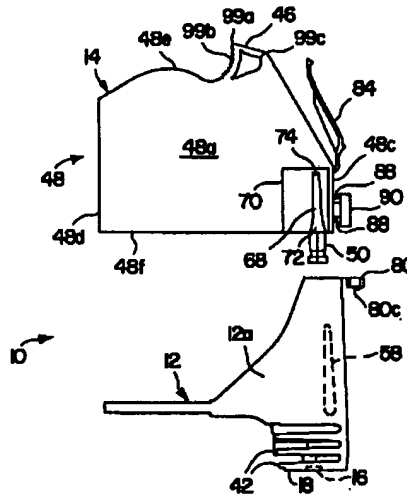
10, 100, 200・・・インクジェットペン、12, 20, 208, 366・・・カートリッジ本体、14, 22, 24, 26, 28, 202, 300, 302, 304, 306, 442・・・インクカートリッジ、16, 30, 32, 34, 36, 368, 370, 372, 37

4・・・プリントヘッド、44, 46, 103, 105, 107, 109, 204, 324, 326, 328, 330・・・ハンドル、50, 110, 112, 114, 116・・・出口ポート、48, 102, 104, 106, 108, 126, 128, 206・・・本体部、84, 118, 120, 122, 124, 230, 332, 334, 336, 338・・・ラッチ部材、92, 238・・・脚部、94・・・レバー部、96, 332, 334, 336, 338・・・指部、180, 186, 188, 214, 358, 360, 362, 377, 379, 381, 383・・・スロット、384, 386, 388, 390・・・付勢部材、440, 464・・・カバー、466・・・ポート。

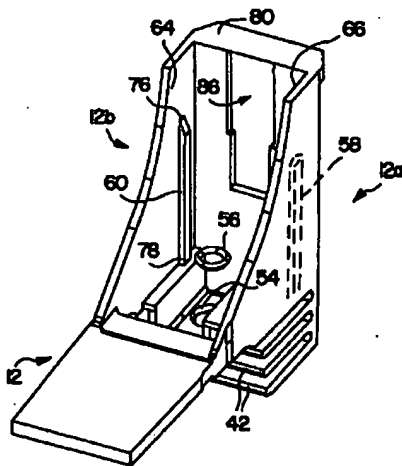
【図1】



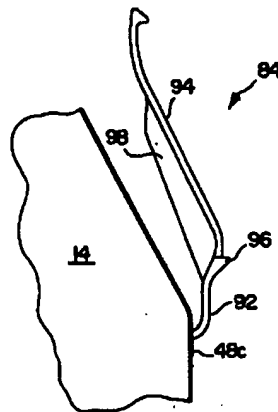
【図2】



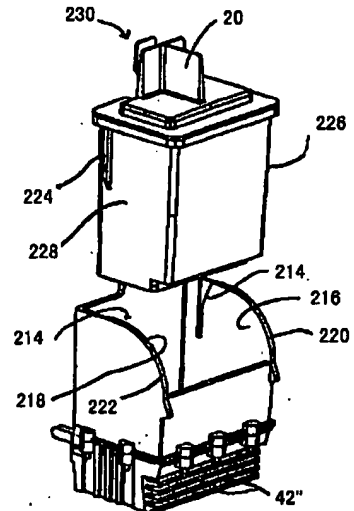
【図3】



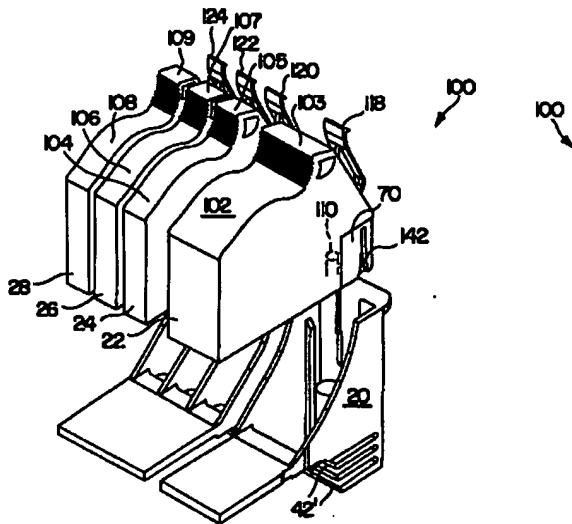
【図4】



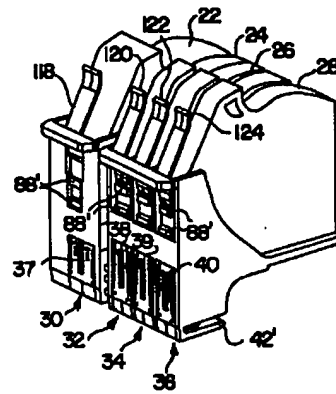
【図11】



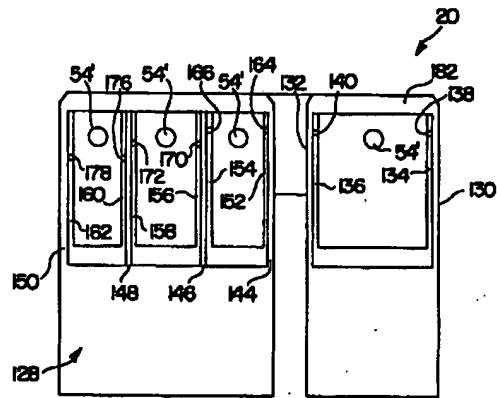
【図5】



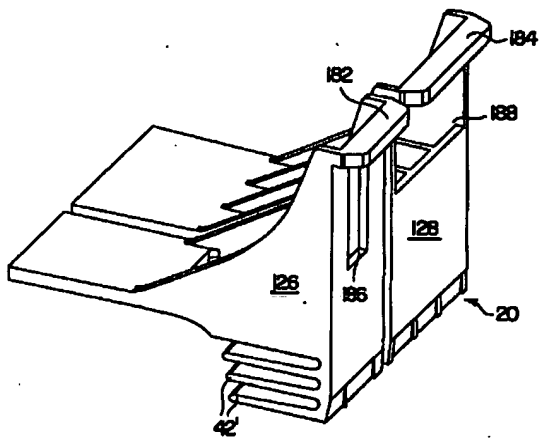
【図6】



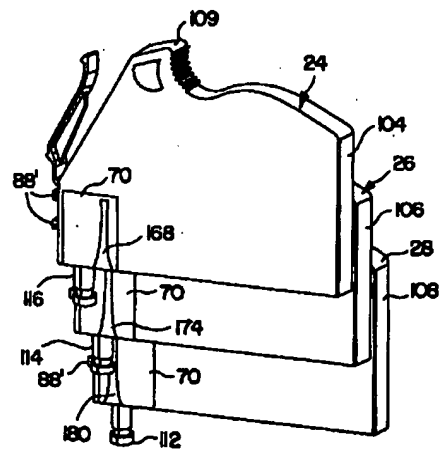
【図8】



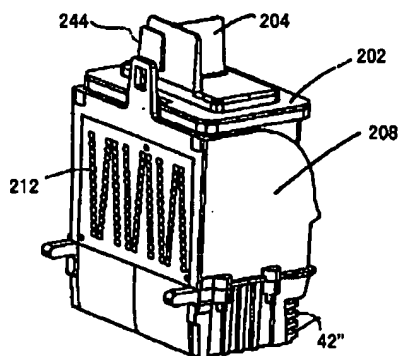
【図7】



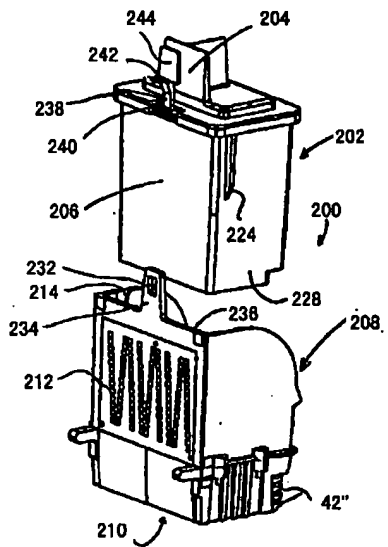
【図9】



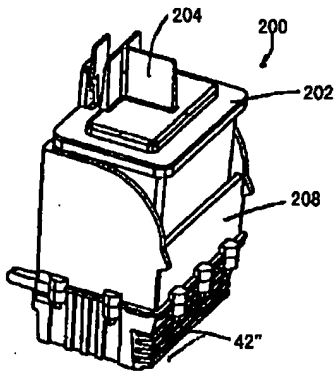
【図12】



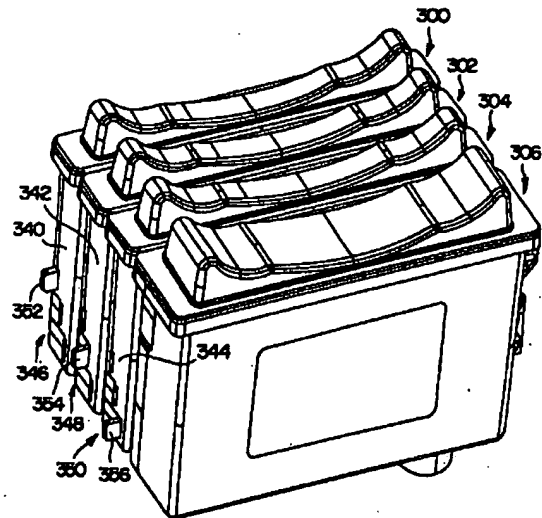
【図10】



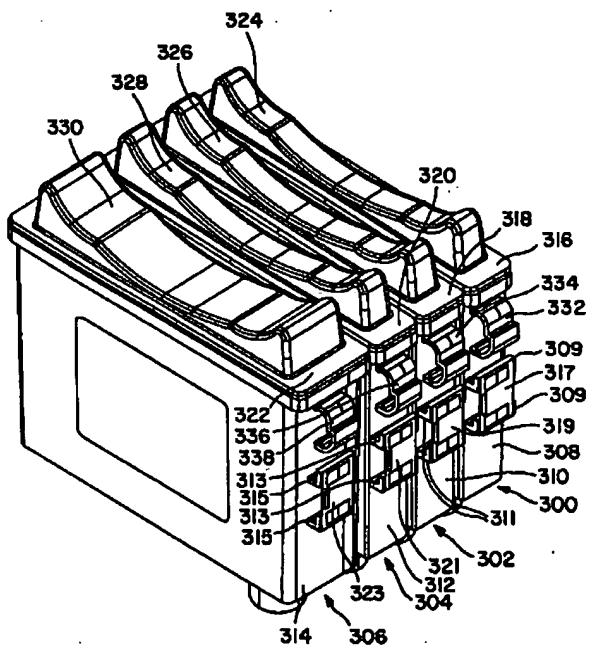
【図13】



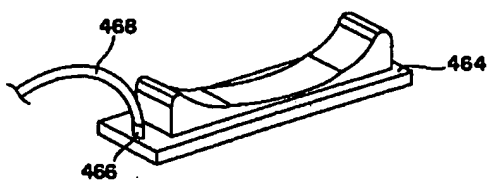
【図15】



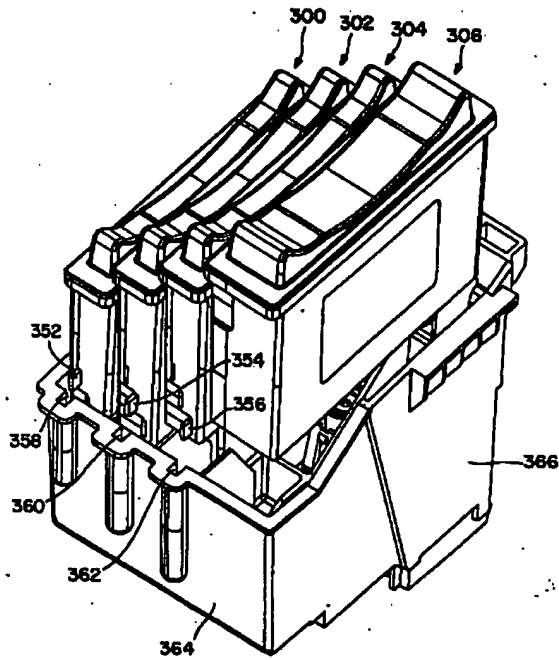
【図14】



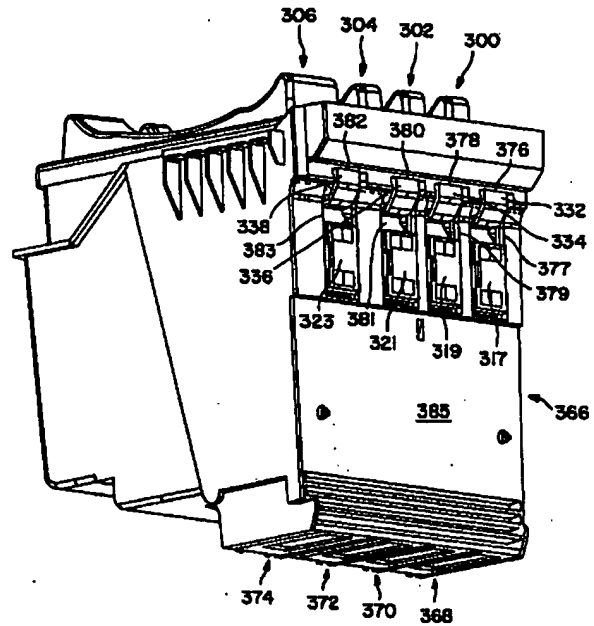
【図20】



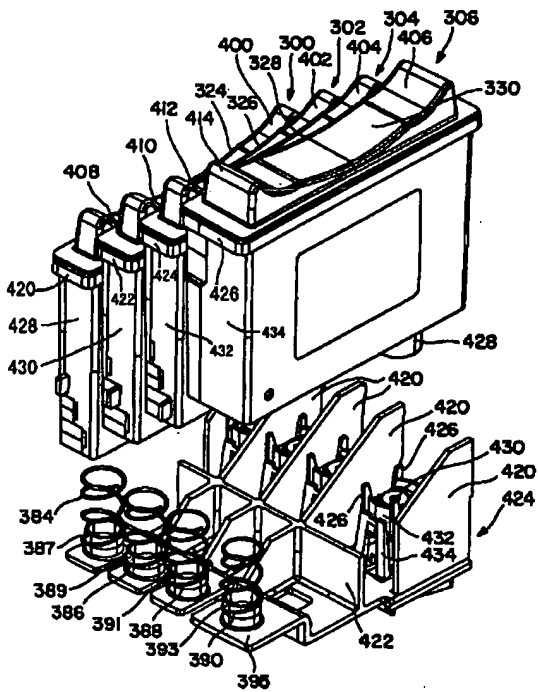
【図16】



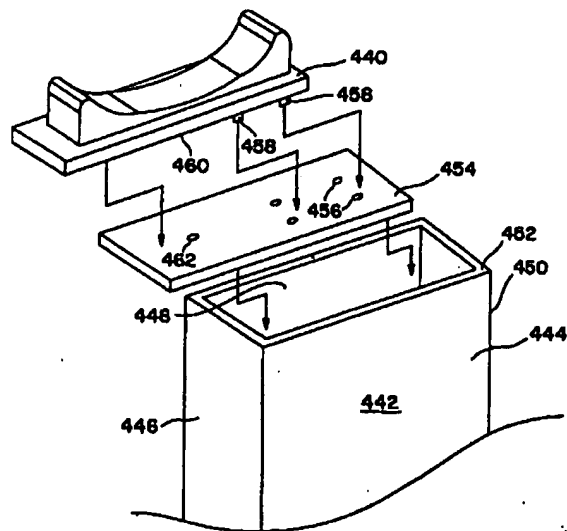
【図17】



【図18】



【図19】



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